IMPERIAL COUNTY
AIR POLLUTION CONTROL DISTRICT

Picture taken by Air Pollution staff January 18, 2014 – Typical winter day as one enters Calexico California. Staff is driving south on Highway 111 approaching the intersection of Cole Road and Highway 111 in Calexico.

January 31, 2014
Exceptional Event Documentation
For the Imperial County PM_{10} Nonattainment Area

FINAL REPORT

March 20, 2017

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ACRONYM DESCRIPTIONS

AQI	Air Quality Index
AQS	Air Quality System
BACM	Best Available Control Measures
BAM 1020	Beta Attenuation Monitor Model 1020
BLM	United States Bureau of Land Management
BP	United States Border Patrol
CAA	Clean Air Act
CARB	California Air Resources Board
CMP	Conservation Management Practice
DCP	Dust Control Plan
DPR	California Department of Parks and Recreation
EER	Exceptional Events Rule
EPA	Environmental Protection Agency
FEM	Federal Equivalent Method
FRM	Federal Reference Method
GOES-W/E	Geostationary Operational Environmental Satellite (West/East)
HF	Historical Fluctuations
HYSPLIT	Hybrid Single Particle Lagrangian Integrated Trajectory Model
ICAPCD	Imperial County Air Pollution Control District
ITCZ	Inter Tropical Convergence Zone
KBLH	Blythe Airport
KCZZ	Campo Airport
KIPL	Imperial County Airport
KNJK	El Centro Naval Air Station
KNYL/MCAS	Yuma Marine Corps Air Station
KPSP	Palm Springs International Airport
KTRM	Jacqueline Cochran Regional Airport (aka Desert Resorts Rgnl Airport)
LST	Local Standard Time
MMML/MXL	Mexicali, Mexico Airport
MPH	Miles Per Hour
MST	Mountain Standard Time
NAAQS	National Ambient Air Quality Standard
NCAR	National Center for Atmospheric Research
NCEI	National Centers for Environmental Information
NEAP	Natural Events Action Plan
NEXRAD	Next-Generation Radar
NOAA	National Oceanic and Atmospheric Administration
nRCP	Not Reasonably Controllable or Preventable
NWS	National Weather Service
PDT	Pacific Daylight Time
PM_{10}	Particulate Matter less than 10 microns
$PM_{2.5}$	Particulate Matter less than 2.5 microns

PST	Pacific Standard Time
QA/QC	Quality Assured and Quality Controlled
QCLCD	Quality Controlled Local Climatology Data
RACM	Reasonable Available Control Measure
RAWS	Remote Automated Weather Station
SIP	State Implementation Plan
SLAMS	State Local Ambient Air Monitoring Station
SMP	Smoke Management Plan

I Introduction

On January 31, 2014, the State and Local Ambient Air Monitoring Station (SLAMS) (AQS Site Code 06-025-0007), located in Brawley, California recorded an exceedance of the National Ambient Air Quality Standard (NAAQS) when the Federal Equivalent Method (FEM), Beta Attenuation Monitor Model 1020 (BAM 1020) measured a (midnight to midnight) 24-hr average Particulate Matter less than 10 microns (PM_{10}) concentration of 198.7 $\mu g/m^3$. PM_{10} 24-hr measurements measured above the 150 $\mu g/m^3$ are exceedances of the NAAQS. January 31, 2014 was not a scheduled run day for the Federal Reference Method (FRM) Size-Selective Inlet (SSI) high volume samplers in Imperial County. The SLAMS in Brawley was the only station, in Imperial County to record an exceedance of the PM_{10} NAAQS on January 31, 2014.

TABLE 1-1
BRAWLEY CONCENTRATIONS OF PM_{10} ON JANUARY 31, 2014

DATE	MONITORING SITE	AQS ID	POC(s)	HOURS	24-HOUR CONCENTRATION ug/m^3	PM_{10} NAAQS ug/m^3
01/31/2014	Brawley	06-025-0007	3	24	198.7	150

The Imperial County Air Pollution Control District (ICAPCD) has been submitting PM_{10} data from FRM SSI instruments since 1986 into the United States Environmental Protection Agency's (USEPA) Air Quality System (AQS). Most recently, since 2013 ICAPCD has been submitting continuous PM_{10} data from BAM 1020's. On January 31, 2014 the Brawley monitor was impacted by elevated particulate matter caused by the entrainment of fugitive windblown dust from high winds generated by a low pressure system moving across southeastern California.

This report demonstrates that the exceedance observed on January 31, 2014 was caused by a naturally occurring event which elevated particulate matter affecting air quality, was not reasonably controllable or preventable (nRCP), was in excess of normal historical fluctuations (HF) and would not have occurred "but for" the entrainment of fugitive windblown dust from outlaying deserts and mountains from the Sonoran Desert. The document further substantiates the request by the ICAPCD to flag a PM_{10} 24-hour NAAQS exceedance of 198.7 $\mu g/m^3$ as an exceptional event. This demonstration substantiates that this event meets the definition of the USEPA Regulation for the Treatment of Data Influenced by Exceptional Events (EER)[1].

I.1 Demonstration Contents

Section II - Describes the January 31, 2014 event as it occurred in California and into Imperial County, providing background information of the exceptional event and explaining how the event affected air quality. Overall, this section provides the evidence that the event was a natural event.

[1] "Treatment of Data Influenced by Exceptional Events; Final Rule", 72 FR 13560, March 22, 2007

Section III - Describes the normal historical fluctuations using data charts, summaries, and time-series graphs which demonstrate that the elevated concentrations of PM_{10} on January 31, 2014 were in excess of normal historical fluctuations.

Section IV - Provides evidence that the event of January 31, 2014 was not reasonably controllable or preventable despite the full enforcement and implementation of Best Available Control Measures (BACM).

Section V - Discusses and establishes the clear causal relationship between the exceedance at the Brawley station and the natural event which occurred on January 31, 2014. This section provides evidence that the event affected air quality as a result of a natural event

Section VI - Brings together the evidence presented within this report and shows a clear causal relationship between the natural event, the exceedance and how BACM was overwhelmed making it nRCP concluding that the exceedance which occurred January 31, 2014 would not have occurred "but for" the natural event.[2]

I.2 Requirements of the Exceptional Event Rule

The above sections combined comprise the technical requirements described under the Exceptional Events Rule (EER) under 40 CFR §50.14(c)(3)(iv). However, there are additional non-technical requirements that must be met in order for the USEPA to concur with flagged air quality monitoring data.

I.2.a Public Notification that a potential event was occurring

The National Weather Service (NWS) Phoenix office issued zone forecasts predicting winds of 15 to 25 mph and gusts up to 30 miles per hour (mph) could impact southeastern California starting the afternoon of January 30, 2014 and continuing throughout January 31, 2014. Due to the potential for high winds and poor air quality, the ICAPCD issued a "No Burn" day for January 30 and 31, 2014 in Imperial County. **Appendix A** contains copies of notices as they were issued during the morning of January 30 and 31, 2014.

I.2.b Notification to USEPA of the intent to exclude a measured exceedance (40 CFR §50.14(c)(2)(I))

States are required under federal regulation to submit measured ambient air quality data into the AQS. AQS is the federal repository of Quality Assured and Quality Controlled (QA/QC) air ambient data used for regulatory purposes. Ambient data that is potentially influenced by an

[2] On October 3, 2016 the USEPA finalized the revision for areas subject to mitigation requirements under the "Treatment of Data Influenced by Exceptional Events." Within the final revised rulemaking the USEPA removed the "2007 Exceptional Events Rule" language commonly referred to as the "but for" criterion giving greater emphasis to the "clear causal relationship" for analysis as a final revision.

exceptional event must be appropriately flagged and initially described and submitted to USEPA according to 40 CFR § 50.14(c)(2)(iii) no later than July 1st of the calendar year following the year in which the flagged measurement occurred.[3]

The ICAPCD made a written request to the California Air Resources Board (CARB) to place a preliminary flag on the SLAMS measured concentration in Brawley. The request, dated May 28, 2015 requested an initial flag for the measurement from the BAM 1020 in Brawley of 198.7 $\mu g/m^3$. A brief description was included with the initial flag which included meteorological data which indicated a potential natural event had occurred on January 31, 2014.

I.2.c Documentation that the public comment process was followed for the event demonstration that was flagged for exclusion (40 CFR §50.14(c)(3)(v))

The ICAPCD posted, for a 30 day public review, a draft version of this demonstration on the ICAPCD webpage and published a notice of availability in the Imperial Valley Press on December 21, 2016. The notice advised the general public that comments were being solicited regarding this demonstration which supports the request, by the ICAPCD, to exclude the measured concentration of 198.7 $\mu g/m^3$ which occurred on January 31, 2014. The final closing date for comments was January 23, 2017. **Appendix A** contains a copy of the public notice affidavit along with any comments received by the ICAPCD for submittal as part of the demonstration (40 CFR §50.14(c)(3)(v)).

I.2.d Documentation submittal supporting an Exceptional Event Flag (40 CFR §50.14(a)(1-2))

States that have flagged data as a result of an exceptional event and who have requested an exclusion of said flagged data are required to submit a demonstration that justifies the data exclusion to the USEPA no later than 3 years following the end of the calendar quarter in which the flagged concentration was measured or 12 months prior to the date that a regulatory decision must be made by USEPA.[4]

The ICAPCD, after the close of the comment period and after consideration of the comments will submit this demonstration along with all required elements, including received comments and responses to USEPA Region 9 in San Francisco, California. The deadline for the submittal of this demonstration is March 31, 2017; however, it currently has regulatory implications for the PM_{10} SIP due in 2016.[5]

[3] With the adoption of the revised rule on October 3, 2016 the cited section changed to 40 CFR § 50.14(c)(2)(B) which requires regular communication with the EPA regional office when potential EE affect a regulatory decision. (See footnote 4)

[4] On October 3, 2016 the USEPA finalized the revision for areas subject to mitigation requirements under the "Treatment of Data Influenced by Exceptional Events." Within the final revised rulemaking the USEPA removed the "2007 Exceptional Events Rule" language requiring Initial Notifications within 3 years following the end of a calendar quarter. Instead the new revised rule requires an exchange between agencies and the USEPA in the form of "regular communications" to identify data that have been potentially influenced by an exceptional event.

[5] The original deadline of March 31, 2017 was based on the 2007 version of the EE rule. This deadline no longer applies.

I.2.e Necessary demonstration to justify an exclusion of data under (40 CFR§50.14(c)(3)(iv))

A This demonstration provides evidence that the event, as it occurred on January 31, 2014, satisfies the definition in 40 CFR §50.1(j) and (k) for an exceptional event.

a The event "affects air quality"
b The event "is not reasonably controllable or preventable."
c The event is "caused by human activity that is unlikely to recur at a particular location or [is] a natural event."
d The event is a "natural event" where human activity played little or no direct causal role.

B This demonstration provides evidence that air quality was affected by the exceptional event in Imperial County. There is a clear causal relationship between the event and the measured concentrations in Brawley supporting that the event affected the air quality in Imperial County.

C This demonstration provides evidence that the measured concentration, caused by the event, is in excess of normal historical fluctuations.

D This demonstration provides evidence that "but-for" the event there would have been no exceedance.[6]

[6] On October 3, 2016 the USEPA finalized the revision for areas subject to mitigation requirements under the "Treatment of Data Influenced by Exceptional Events." Within the final revised rulemaking the USEPA removed the "2007 Exceptional Events Rule" language commonly referred to as the "but for" criterion giving greater emphasis to the "clear causal relationship" for analysis as a final revision.

II January 31, 2014 Conceptual Model

This section provides a summary description of the meteorological and air quality conditions under which the January 31, 2014 event unfolded in Imperial County. The subsection elements include

- » A description and map of the geographic setting of the air quality and meteorological monitors
- » A description of Imperial County's climate
- » An overall description of meteorological and air quality conditions on the event day.

II.1 Geographic Setting and Monitor Locations

According to the United States Census Bureau, Imperial County has a total area of 4,482 square miles of which 4,177 square miles is land and 305 square miles is water. Much of Imperial County is below sea level and is part of the Colorado Desert an extension of the larger Sonoran Desert (**Figure 2-1)**.

FIGURE 2-1
COLORADO DESERT AREA IMPERIAL COUNTY

Fig 2-1: 1997 California Environmental Resources Evaluation System. According to the United States Geological Survey (USGS) Western Ecological Research Center the Colorado Desert bioregion is part of the bigger Sonoran Desert Bioregion which includes the Colorado Desert and Upper Sonoran Desert sections of California and Arizona, and a portion of the Chihuahuan Basin and Range Section in Arizona and New Mexico (Forest Service 1994).

A notable feature in Imperial County is the Salton Sea which is at 235 feet below sea level. The Chocolate Mountains are located east of the Salton Sea and extend in a northwest-southeast direction for approximately 60 miles (**Figure 2-2)**. In this region, the geology is dominated by the transition of the tectonic plate boundary from rift to fault. The southernmost strands of the San Andreas Fault connect the northern-most extensions of the East Pacific rise. Consequently, the region is subject to earthquakes and the crust is being stretched, resulting in a sinking of the terrain over time.

FIGURE 2-2
SURROUNDING AREAS OF THE SALTON SEA

Fig 2-2: Image courtesy of the Image Science and Analysis Laboratory NASA Johnson Space Center, Houston Texas.

All of the seven incorporated cities, along with the unincorporated City of Niland, are surrounded by agricultural fields to the north, east, west and south (**Figure 2-3)**. Together, these communities and agricultural fields make what is known as the Imperial Valley. Surrounding the Imperial Valley are desert areas found on the eastern and western portions of Imperial County.

FIGURE 2-3
LOCATION AND TOPOGRAPHY OF IMPERIAL COUNTY

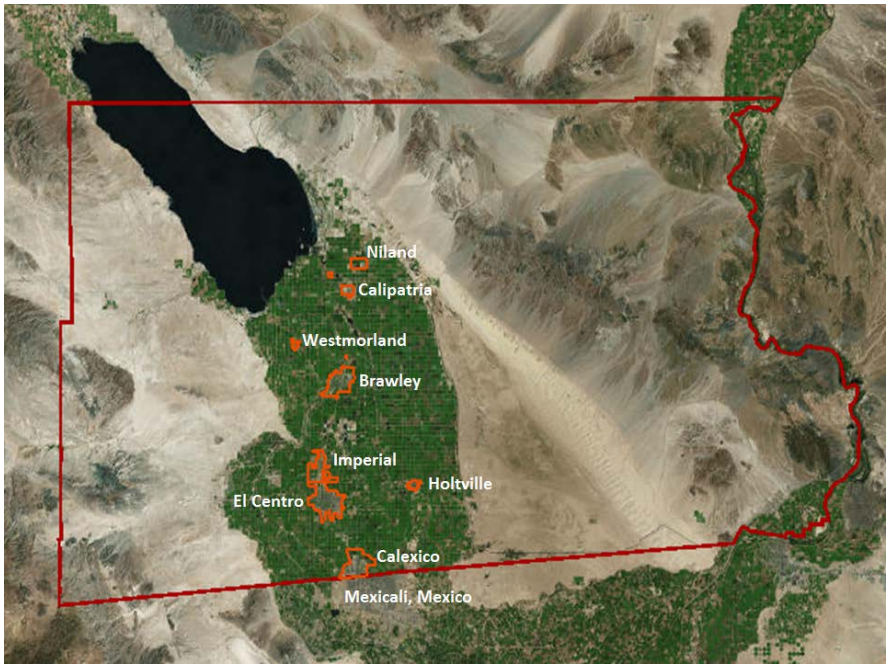


Fig 2-3: Depicts the seven incorporated cities within Imperial Valley - City of Calipatria, City of Westmorland, City of Brawley, City of Imperial, City of El Centro, City of Holtville, City of Calexico. Niland is unincorporated. Mexicali, Mexico is to the south.

Furthermore, portions of the Sonoran Desert located to the east and west of Imperial County expand to the southeast and southwest into Mexico (**Figure 2-4)**. Combined, these deserts are sources of dust emissions which impact the Imperial County during high wind events.

FIGURE 2-4
DESERTS IN CALIFORNIA, YUMA AND MEXICO

Fig 2-4: Depicts the Sonoran Desert as it extends from southeastern California, southwestern Arizona, and into northern Mexico. Source: Google Earth.

The air quality and meteorological monitoring stations used in this demonstration are shown in **Figure 2-5**. SLAMS in Imperial County are located in Calexico, El Centro, Westmorland, Brawley, and Niland. Each station measures air quality and meteorological data; the station located in Brawley only measures air quality and no meteorological data. Other air monitoring stations with air quality and meteorological data used for this demonstration include stations in Riverside County and southwestern Arizona (**Figure 2-5 and Table 2-1)**.

As mentioned above, the PM_{10} exceedance on January 31, 2014, occurred at the Brawley station. The Brawley station is regarded as a northern area monitoring site within the Imperial County air monitoring network. In order to properly analyze the contributions of meteorological conditions occurring on January 31, 2014, other meteorological sites used in this demonstration include airfields in eastern Riverside County, southwestern Yuma (Arizona) County, and Imperial County, along with other sites relevant to the wind event (**Figure 2-5)**.

FIGURE 2-5
MONITORING SITES IN IMPERIAL COUNTY

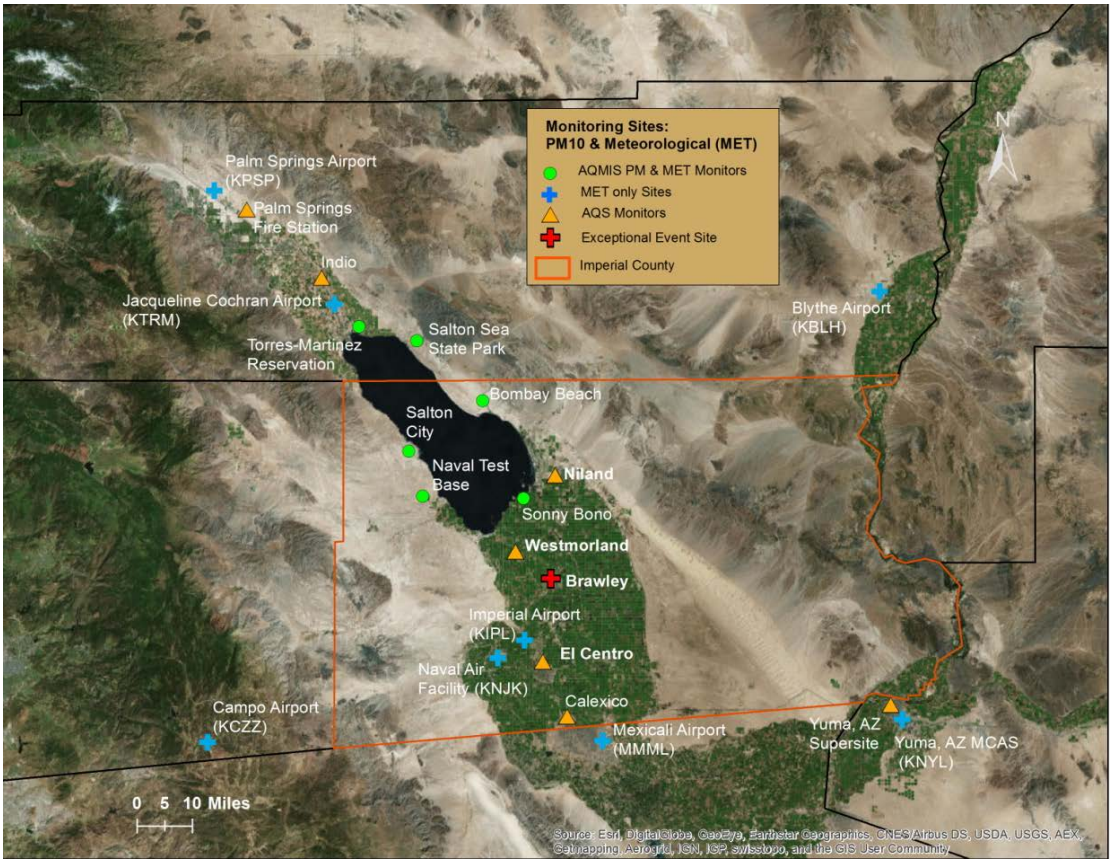


Fig 2-5: Depicts a select group of meteorological and PM_{10} monitoring sites in Imperial County, eastern Riverside County, southern San Diego County, southwestern Yuma (Arizona) County, and northern Mexico. The image exemplifies the regional area impacted by the exceptional event which occurred on January 31, 2014.

TABLE 2-1
MONITORING SITES IN IMPERIAL COUNTY, RIVERSIDE COUNTY, AND ARIZONA
JANUARY 30 AND JANUARY 31, 2014

Monitor Site Name	Operator*	Monitor Type	AQS ID	AQS PARAMETER CODE	ARB Site Number	Elevation (meters)	Day	24-hr PM_{10} (ug/m^3) Avg	1-hr PM_{10} (ug/m^3) Max	Time of Max Reading	Max Wind Gust (mph)	Time of Max Wind Gust
IMPERIAL COUNTY												
Calexico-Ethel Street	CARB	Hi-Vol Gravimetric	06-025-0005	(81102)	13698	3	30th	-	-	-	14.2	23:00
							31st	-	-	-	22.2	0:00
El Centro-9th Street	ICAPCD	Hi-Vol Gravimetric	06-025-1003	(81102)	13694	9	30th	-	-	-	16.0	23:00
							31st	-	-	-	13.2	3:00
Brawley-Main Street #2	ICAPCD	BAM 2010	06-025-0007	(81102)	13701	-15	30th	111.9	734.8	21:00	-	-
		BAM 2010					31st	198.7	815.0	1:00	-	-
		Hi-Vol Gravimetric					31st	-	-	-	-	-
Westmorland	ICAPCD	BAM 2010	06-025-4003	(81102)	13697	-43	30th	-	-	-	-	-
		BAM 2010					31st	-	-	-	-	-
		Hi-Vol Gravimetric					31st	-	-	-	-	-
Niland-English Road	ICAPCD	BAM 2010	06-025-4004	(81102)	13997	-54	30th	89.5	372.0	19:00	12.5	10:00
		BAM 2010					31st	87.4	529.0	5:00	27.3	5:00
		Hi-Vol Gravimetric					31st	-	-	-	-	-
RIVERSIDE COUNTY												
Palm Springs Fire Station	SCAQMD	TEOM	06-065-5001	(81102)	33137	174	30th	42.8	151.0	20:00	20.7	19:00
							31st	24.3	154.0	11:00	35.7	22:00
Indio (Jackson St.)	SCAQMD	TEOM	06-065-2002	(81102)	33157	1	30th	79.0	330.0	19:00	12.0	19:00
							31st	20.9	78.0	21:00	12.0	16:00
ARIZONA – YUMA												
Yuma Supersite	ADEQ	TEOM	04-027-8011	(81102)	N/A		30th	43.2	120.0	8:00	13.8	10:00
							31st	133.0	476.0	1:00	28.8	8:00

CARB = California Air Resources Board
ICAPCD = Air Pollution Control District, Imperial County
SCAQMD = South Coast Air Management Quality District
ADEQ =Arizona Department of Environmental Quality

II.2 Climate

As mentioned above, Imperial County is part of the Colorado Desert, which is a subdivision of the larger Sonoran Desert (**Figure 2-6**) encompassing approximately 7 million acres (28,000 km^2). The desert area encompasses Imperial County and includes parts of San Diego County, Riverside County, and a small part of San Bernardino County.

FIGURE 2-6
SONORAN DESERT REGION

Fig 2-6: Depicts the magnitude of the region known as the Sonoran Desert. Source: Desertmuseum.org.

The majority of the Colorado Desert lies at a relatively low elevation, below 1,000 feet (300 m), with the lowest point of the desert floor at 275 feet (84 m) below sea level at the Salton Sea. Although the highest peaks of the Peninsular Range reach elevations of nearly 10,000 feet (3,000 m), most of the region's mountains do not exceed 3,000 feet (910 m).

In the Colorado Desert (Imperial County), the geology is dominated by the transition of the tectonic plate boundary from rift to fault. The southernmost strands of the San Andreas Fault connect to the northern-most extensions of the East Pacific Rise. Consequently, the region is subject to earthquakes, and the crust is being stretched, resulting in a sinking of the terrain over time.

The Colorado Desert's climate distinguishes it from other deserts. The region experiences greater summer daytime temperatures than higher-elevation deserts and almost never experiences frost. In addition, the Colorado Desert experiences two rainy seasons per year (in the winter and late summer), especially toward the southern portion of the region; the more northerly Mojave Desert usually has only winter rains.

The west coast Peninsular Ranges, or other west ranges, of Southern California–northern Baja California, block most eastern Pacific coastal air and rains, producing an arid climate. Other short or longer-term weather events can move in from the Gulf of California to the south, and are often active in the summer monsoons. These include remnants of Pacific hurricanes, storms from the southern tropical jet stream, and the northern Inter Tropical Convergence Zone (ITCZ).

The arid nature of the region is demonstrated when historic annual average precipitation levels in Imperial County average 3.11" (**Figure 2-7)**. During the 12 month period prior to January 31, 2014, Imperial County recorded total annual precipitation of 2.15 inches.

FIGURE 2-7
IMPERIAL COUNTY HISTORICAL WEATHER

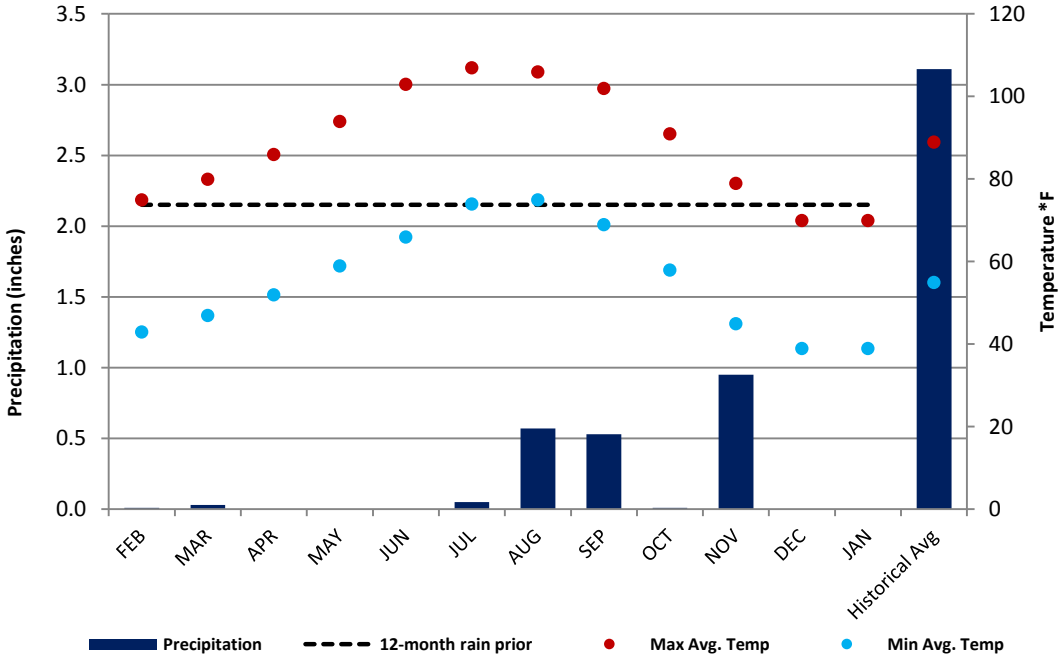


Fig 2-7: Prior to January 31, 2014, the region had suffered abnormally low precipitation of 2.15 inches. Average annual precipitation is 3.11 inches. Metoerological data courtesy of the Weather Underground, California Observed Climate Normals, and the Western Regional Climate Center (WRCC)

While windblown dust events in Imperial County during the summer monsoon season are often due to outflow winds from thunderstorms, windblown dust events in the fall, winter, and spring are usually due to strong winds associated with low-pressure systems and cold fronts moving southeast across California. These winds are the result of strong surface pressure gradients between the approaching low-pressure system, accompanying cold front, and higher pressure ahead of it. As the low-pressure system and cold front approaches and passes, gusty southwesterly winds typically shift to northwesterly. The strong winds can loft dust into the air and transport it over long distances, especially if soils in the region are dry.

II.3 Event Day Summary

The exceptional event for January 31, 2014, was caused by a large low pressure system that moved through southern California the evening of January 30 and continued through January 31. The weather system brought strong westerly winds across the mountains and deserts of southeastern California. High winds were recorded in Imperial Valley and locations just west of Imperial County. A high wind warning was issued for the Coachella Valley in eastern Riverside County, along with the mountains of San Diego County (see **Appendix A**). The high winds associated with the weather system not only led to an exceedance at the Brawley monitoring site on January 31, but also resulted in elevated PM_{10} levels at the Niland monitoring site. **Figures 2-8 and 2-9** show surface analysis maps of the weather system around the time of highest winds in the area.

FIGURE 2-8
SURFACE ANALYSIS IMAGE

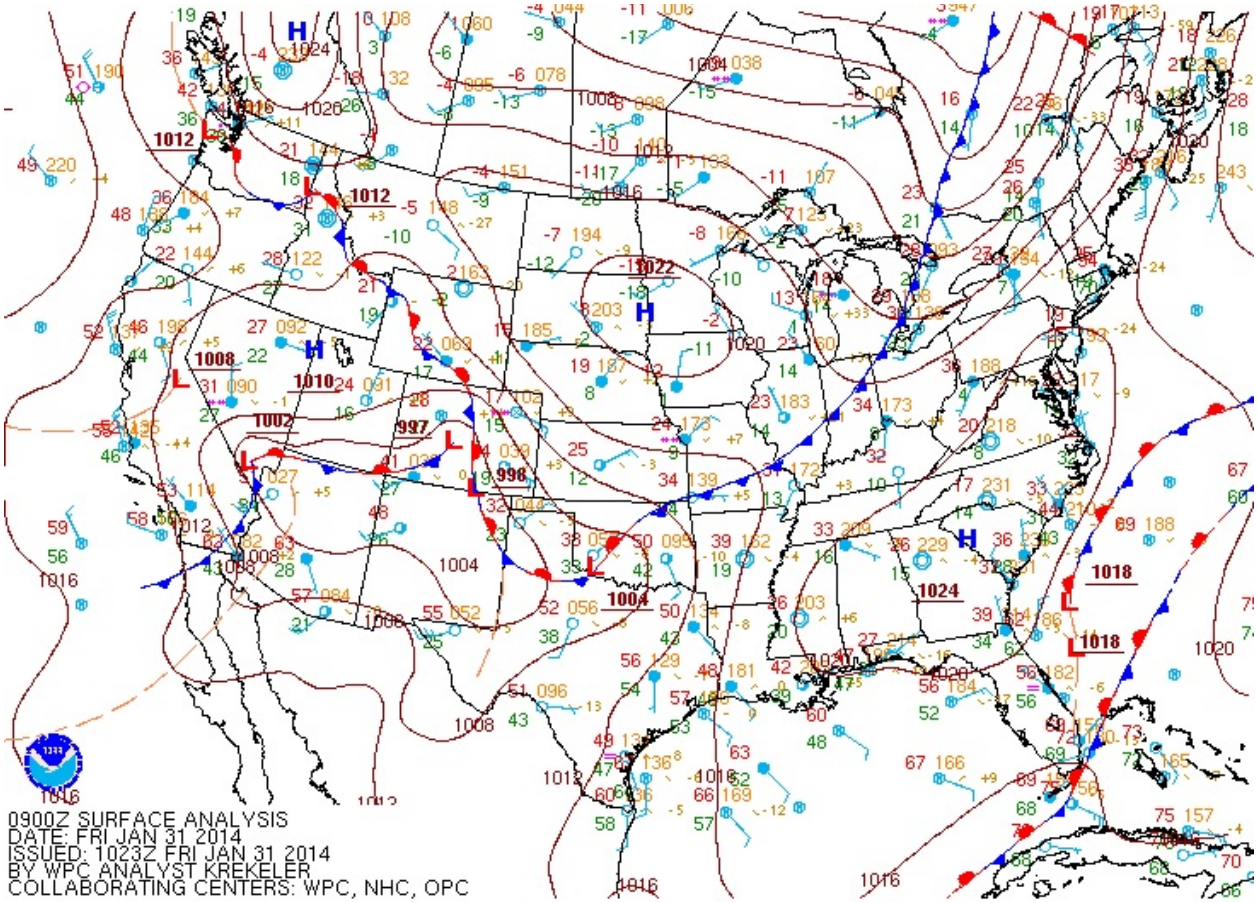


Fig 2-8: A surface analysis map (01:00 PST) on January 31 shows the low pressure system that moved over much of the southwest including southeastern Arizona. A cold front is visible over southeastern California. Image: SFSU Department of Earth & Climate Sciences and the California Regional Weather Server.

FIGURE 2-9
GOES-W INFRARED IMAGE JANUARY 31, 2014

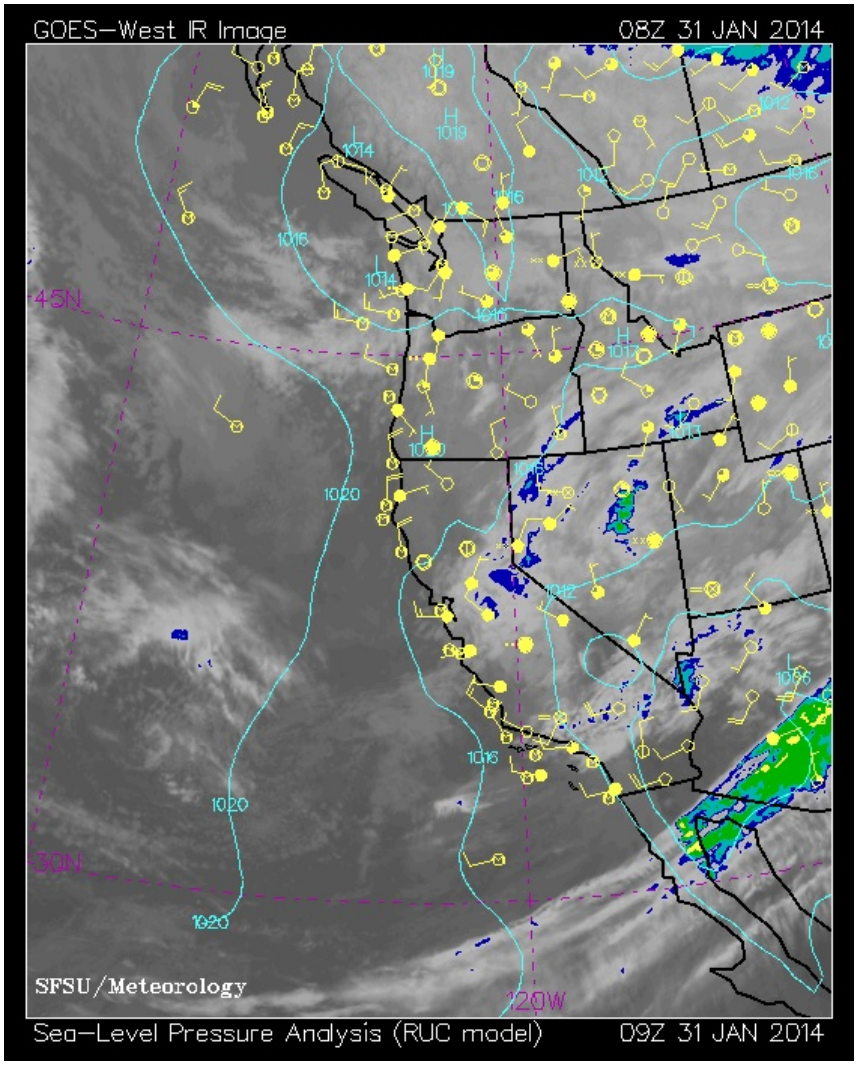


Fig 2-9: A GOES-W infrared satellite composite image (01:00 PST) shows wind barbs over southeastern California indicating winds approximately 23 mph. Image courtesy of SFSU Department of Earth & Climate Sciences and the California Regional Weather Server.

The high winds associated with the low pressure system had a regional impact. The weather system prompted the NWS to issue a high wind advisory for parts of San Diego and Riverside counties on January 30, 2014. As stated in the Storm Events Database report (**see Appendix A**), the low pressure trough brought strong west winds to the mountains and deserts with winds of 25 to 35 mph and gusts up to 60 mph in some areas west of Imperial County. Strong, gusty winds were observed during the evening of January 30 and continued through the following day in Imperial County. The chain of events is visually demonstrated in **Figure 2-10**. Up until 13:00 on January 30, meteorological monitors at Imperial County Airport (KIPL) and El Centro NAF (KNJK) reported light to moderate SSE winds. By 15:00, wind at both sites had shifted to the west-southwest and wind speed experienced a moderate jump (gusts up 31 mph were

reported during the 14:00 hour at KNJK). By 19:00 both locations reported winds of at least 25 mph. El Centro NAF reported gusts up to 41 mph. Between 00:00 and 10:00, winds and gusts declined at both locations, although El Centro NAF had gusts of 28 mph at 03:56, and winds of 20 mph at 05:56. At around 11:00, gusty winds picked up before tapering off by 18:00. As winds increased on January 30, hourly PM_{10} measurements measured at the Brawley air monitoring station began to increase. During the 20:00 hour, PM_{10} levels were measured at 306 $\mu g/m^3$. However, an exceedance of the PM_{10} standard was not measured at the Brawley monitor on January 30, 2014. By midnight on January 31, hourly PM_{10} concentrations had jumped to 535 $\mu g/m^3$, and reached 815 $\mu g/m^3$ during the 01:00 hour. The Niland (English Rd) monitor also recorded a significant increase in PM_{10} levels at 18:00 on January 30, and for the period between 03:00 and 05:00 on January 31, but did not record an exceedance on either day. PM_{10} concentrations at Brawley did not begin to normalize until 22:00 on January 31, 2014. A summary of winds, wind gusts speeds, and wind direction at monitors in Imperial County, Riverside County, Yuma, Arizona and Mexicali, Mexico is shown in **Table 2-2**. For detailed meteorological station graphs see **Appendix B**. For additional correlated wind speed and PM_{10} concentration graphs see **Appendix C**.

FIGURE 2-10
TIME SEQUENCE ANALYSIS JANUARY 31, 2014

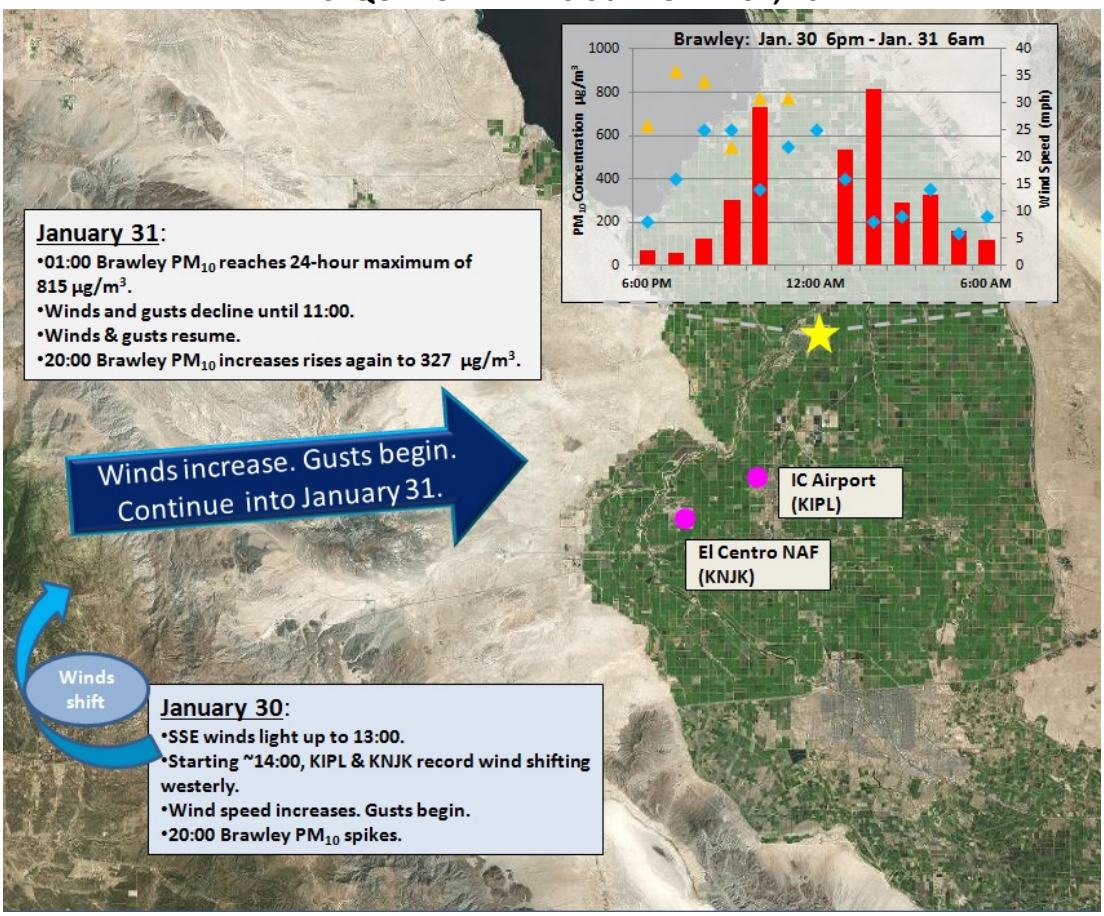


Fig 2-10: The exceptional event began on January 30 when winds increased and gusts began. The high winds on January 30 led to high PM_{10} levels early on January 31.

TABLE 2-2
WIND SPEEDS ON JANUARY 31, 2014

Station Monitor Airport Met Data	Day	Maximum Wind Speed (WS) (mph)	Wind Direction during Max WS (degrees)	Time of Max Wind Speed (PST)	24 hr Maximum Wind Gust (WG) (mph)	Time of Max WG	PM_{10} correlated to time of Max Wind Speed	Hourly Maximum Observed PM_{10} (ug/m3)
Imperial County Airport (KIPL)	31	21	240	13:00	29	14:00	-	-
El Centro NAF (KNJK)	31	24	250	16:00/17:00	29	16:00	-	-
Calexico (Ethel St)	31	22.2	288	00:00	-	-	-	-
El Centro (9th St)	31	13.2	260	03:00	-	-	-	-
Westmorland (Cook St)	31	-	-	-	-	-	-	-
Niland (English Rd)	31	27.3	255	05:00	-	-	529	528
RIVERSIDE COUNTY								
Blythe Airport (KBLH)	31	13.8	260	12:00	-	-	-	-
Palm Springs Airport (KPSP)	31	24.2	320	22:00	35.7	22:00	17	154
Desert Resorts / J. Cochran Airport-Thermal (KTRM)	31	23.0	270	06:00	38	06:00	-	-
ARIZONA - YUMA								
Yuma, AZ MCAS*(MST)	31	16.1	300	08:00	28.8	08:00	58	476
MEXICALI - MEXICO								
Mexicali, Mexico Airport (MMML)	31	23.0	280	09:00	-	-	-	-

The National Oceanic and Atmospheric Administration (NOAA) Air Resources Laboratory HYSPLIT back-trajectory model,[7] **Figure 2-11**, shows the path of air flow in the 12 hours leading up to the hour of maximum PM_{10} concentration recorded by the Brawley FEM monitor on January 31. The path took air flow over the arid, largely barren desert soils to the west of Brawley. Dust particles were lofted and transported by the strong winds on January 30 and January 31, impacting the Brawley FEM PM_{10} monitor. See **Section V** for causal analysis. The elevated levels of PM_{10} concentrations measured in Riverside, Imperial, and Yuma counties illustrate the regional nature of the event (**Tables 2-1 and 2-2**).

[7] The Hybrid Single Particle Lagrangian Integrated Trajectory Model (**HYSPLIT**) is a computer model that is a complete system for computing simple air parcel trajectories to complex dispersion and deposition simulations. It is currently used to compute air parcel trajectories and dispersion or deposition of atmospheric pollutants. One popular use of HYSPLIT is to establish whether high levels of air pollution at one location are caused by transport of air contaminants from another location. HYSPLIT's back trajectories, combined with satellite images (for example, from NASA's MODIS satellites), can provide insight into whether high air pollution levels are caused by local air pollution sources or whether an air pollution problem was blown in on the wind The initial development was a result of a joint effort between NOAA and Australia's Bureau of Meteorology. Source: NOAA/Air Resources Laboratory, 2011.

FIGURE 2-11
NOAA HYSPLIT MODEL

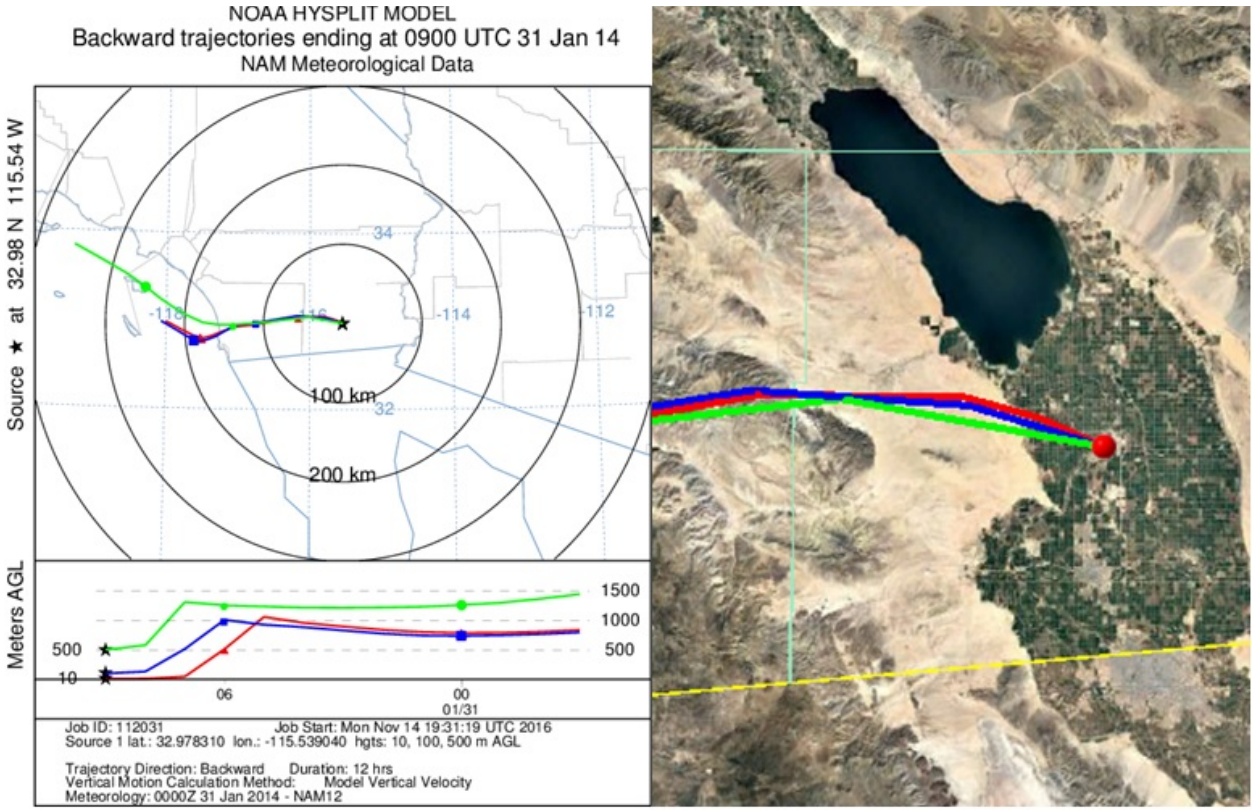


Fig 2-11: A 12-hour back-trajectory ending 01:00 PST at Brawley shows the general path of air in the hours before the exceedance. Aqua line indicates Imperial County border. Yellow line indicates international border. Red line shows air flow at 10 meters, blue 100 meters, and green 500 meters above ground level. It should be noted that modeled winds can differ from local conditions. Data used in the HYSPLIT model has a horizontal resolution of 12 km and is integrated every three hours. Thus, the HYSPLIT model may differ from local observed surface wind speeds and directions. Dynamically generated through NOAA Air Resources Laboratory

Figure 2-12 illustrates the elevated levels of PM_{10} concentrations measured in Riverside, Imperial and Yuma Counties. The entrained dust particles resulted in a (midnight to midnight) 24-hr average concentration of 198.7 µg/m^3 at the Brawley monitor. Best Available Control Measures (BACM) was overwhelmed by the suddenness and intensity of the meteorological event. Although the Brawley and Niland sites saw dramatic increases in PM_{10} concentration on January 30, 2014, it was not enough to cause an exceedance.

FIGURE 2-12
72 HOUR PM_{10} CONCENTRATIONS AT REGIONAL SITES

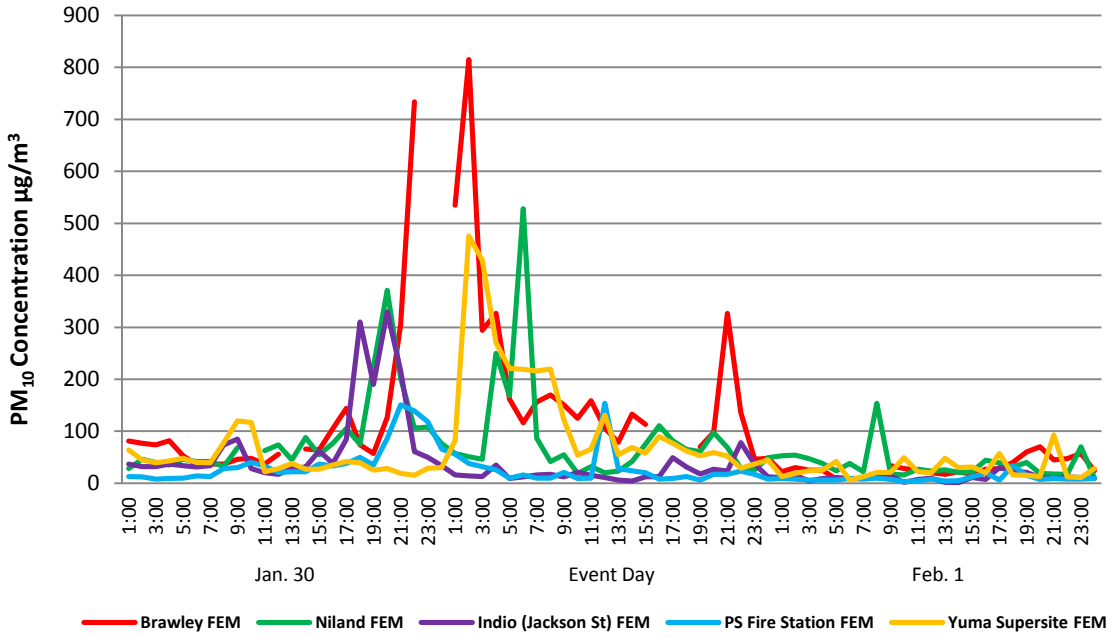


Fig 2-12: Is the graphical representation of the 72-hour relative PM10 concentrations at various monitoring locations throughout Riverside, Imperial, and Yuma counties. The graph demonstrates that elevations of PM_{10} on late January 30 and January 31 at all sites that were impacted by the weather system and accompanying winds.

III Historical Norm

III.1 Analysis

While naturally occurring high wind events may occur seasonally and at times frequently and qualify for exclusion under the EER, historical fluctuations of the particulate concentrations provide insight into the frequency of events within an identified area. The following time series plots illustrate that PM_{10} concentrations measured at the Brawley monitor on January 31, 2014, were unusual and in excess of normal historical fluctuations. The analysis also provides convincing evidence that the event affected air quality.

Figure 3-1 shows the time series of available FRM and BAM 24-hr PM_{10} concentrations at the Brawley monitor for the four year period of January 1, 2010 through January 31, 2014, for a total of 1,492 sample run days. Note that prior to 2013, the BAM data was not considered FEM and was not submitted to AQS. In order to properly establish the intensity of the event, as it occurred on January 31, 2014, 24-hour averaged PM_{10} concentrations were compiled and plotted as a time series, January 1, 2010 to January 31, 2014 to provide a historical perspective of PM_{10} concentrations.

FIGURE 3-1
BRAWLEY HISTORICAL
FRM AND FEM PM_{10} 24 HR AVG CONCENTRATIONS
JANUARY 1, 2010 TO JANUARY 31, 2014

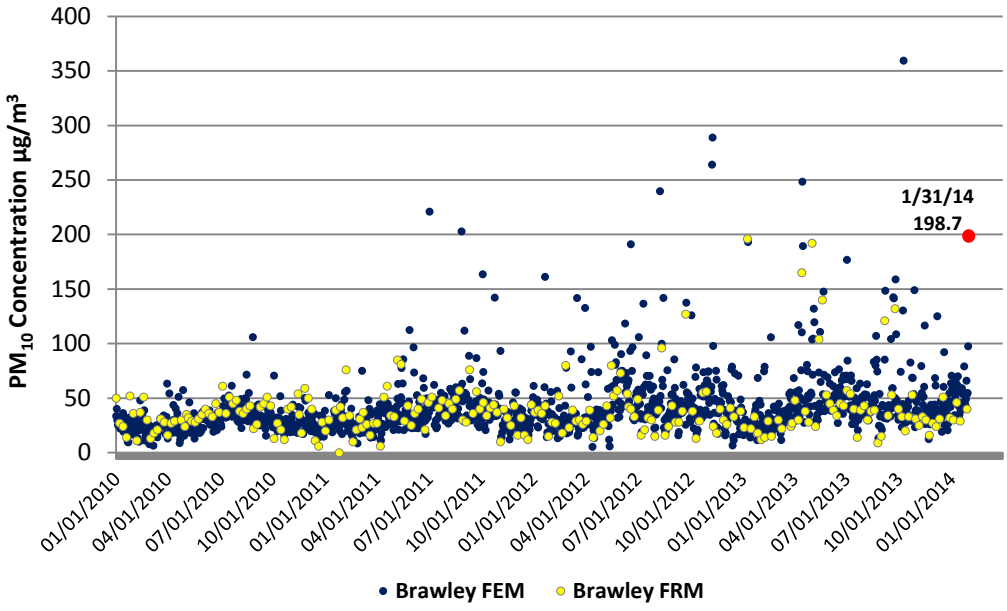


Fig 3-1: A historical comparison of PM_{10} concentrations demonstrates that the January 31, 2014 measured concentration of 198.7 $\mu g/m^3$ from the Brawley BAM 1020 PM_{10} monitor was outside normal historical measurements. Points above 150 $\mu g/m^3$ indicate other historical exceedances. Data from Environmental Protection Agency's (EPA) Air

Quality System (AQS) data bank

The time series, **Figure 3-1**, for Brawley includes a total of 1,734 credible samples, measured by either FRM or FEM monitors between January 1, 2010 and January 31, 2014. During that period 16 exceedances occurred. Of the total 16 exceedances, only three days experienced FRM exceedances. From the three FRM exceedances, two were a combination of FEM/FRM, and one was a single FRM exceedance. For FEM BAM and/or a combination of FRM/FEM measurements during the same time period, there were 15 measured exceedances. Of the 16 measured exceedances only three were recorded during the first quarter (January through March). The other 13 exceedances occurred during the second, third, and fourth quarters during January 1, 2010 through January 31, 2014. No exceedances of the standard occurred during 2010.

Figures 3-2 illustrates the seasonal pattern for Brawley between the months January and March for the years 2010 through 2014, ending January 31, 2014. Of the 454 combined FRM and FEM credible samples, only three exceedances occurred during the first quarter period.

FIGURE 3-2
BRAWLEY SEASONAL COMPARISON
PM_{10} 24 HR AVG CONCENTRATIONS
MONTHS JANUARY TO MARCH

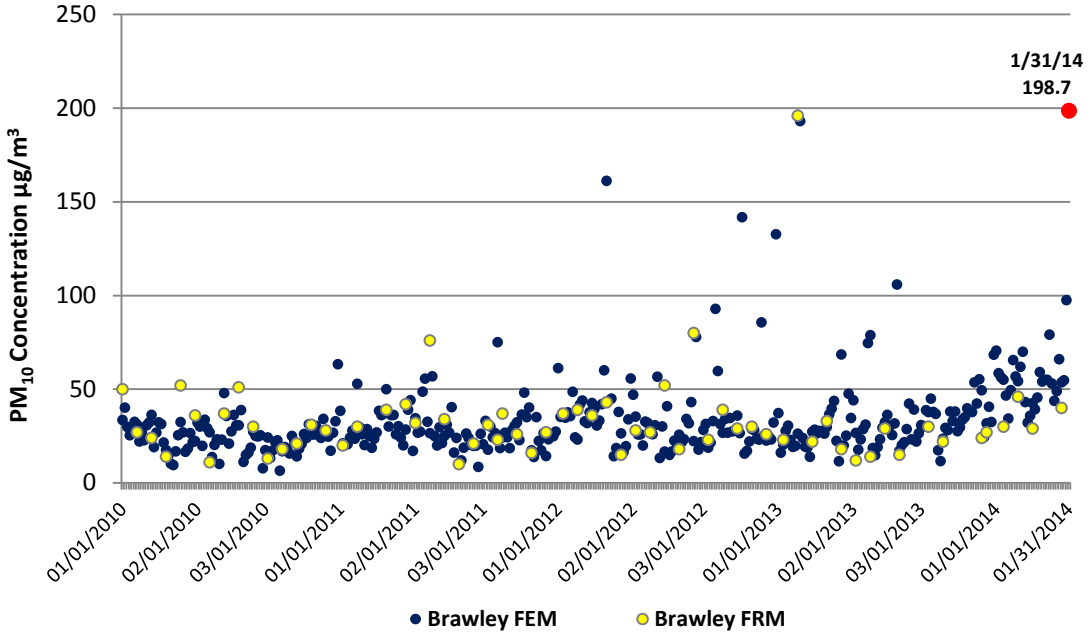


Fig 3-2: The seasonal historical comparison using the months of January through March for the years 2010 through 2014 (ending January 31, 2014) supports that the measured exceedance at the Brawley monitor on January 31, 2014 was outside the normal historical norm. Points above 150 µg/m^3 indicate other historical exceedances. Data from the Environmental Protection Agency's (EPA) Air Quality System (AQS) data bank

FIGURE 3-3
BRAWLEY HISTORICAL
PM_{10} 24 HR FRM & FEM AVG CONCENTRATIONS
JANUARY 1, 2010 TO JANUARY 31, 2014

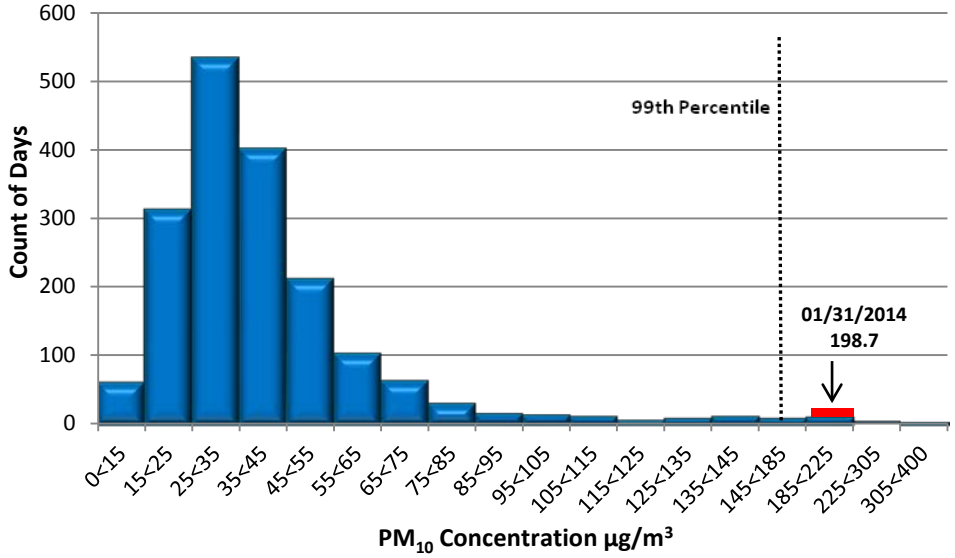


Fig 3-3: The 24-hr average PM_{10} concentrations measured at Brawley monitoring site demonstrates that the January 31, 2014 event was in excess of the 99th percentile.

FIGURE 3-4
BRAWLEY SEASONAL
PM_{10} 24 HR FRM & FEM CONCENTRATIONS
JANUARY 1, 2010 TO MARCH 31, 2014

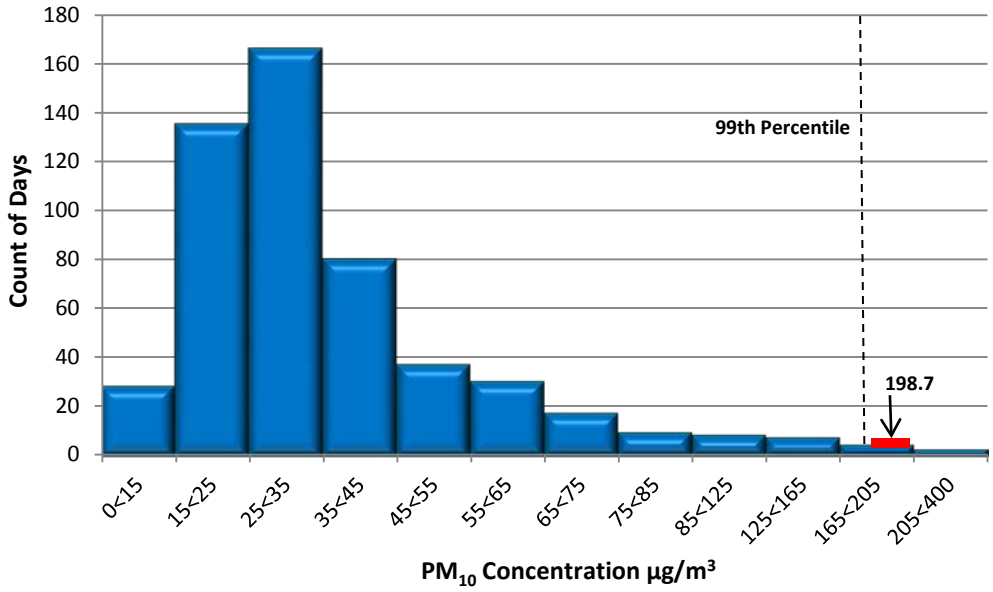


Fig 3-4: The 24-hr average PM_{10} concentration at the Brawley monitoring sites demonstrates that the January 31, 2014 event was in excess of the 99th percentile.

For the combined FRM and FEM annual 2010 through 2014 Brawley dataset, the FEM concentration of 198.7 µg/m^3 for Brawley is above the 99th percentile ranking. As mentioned above, FEM BAM data was not considered regulatory from 2010 to 2012. However, this does not materially affect the percentile rankings. For the combined FRM and FEM seasonal historical (January 2010 through March 2014) dataset for Brawley, the FEM concentrations of 198.7 µg/m^3 for Brawley is above the 99th percentile ranking. Looking at the annual time series concentrations, the seasonal time series concentrations, and the percentile rankings, the January 31, 2014 measured exceedance of 198.7 µg/m^3 is clearly in excess of normal historical fluctuations with seasonal exceedances of the NAAQS not occurring frequently.

III.2 Summary

The information provided, above, by the time series plot, seasonal time series plot, and the percentile ranking, illustrate that the PM_{10} concentration observed on January 31, 2014 occur infrequently. When comparing the measured PM_{10} levels on January 31, 2014 and following USEPA EER guidance, this demonstration provides supporting evidence that the measured exceedance measured at the Brawley site was outside the normal historical fluctuations. This historical concentration data and the demonstration found under the clear causal relationship supports that the measured exceedance on January 31, 2014 was an exceptional event and that it affected air quality.

IV Not Reasonably Controllable or Preventable

IV.1 Background

Inhalable particulate matter (PM_{10}) contributes to effects that are harmful to human health and the environment, including premature mortality, aggravation of respiratory and cardiovascular disease, decreased lung function, visibility impairment, and damage to vegetation and ecosystems. Upon enactment of the 1990 Clean Air Act (CAA) amendments, Imperial County was classified as moderate nonattainment for the PM_{10} NAAQS under CAA sections 107(d)(4)(B) and 188(a). By November 15, 1991, such areas were required to develop and submit State Implementation Plan (SIP) revisions providing for, among other things, implementation of reasonably available control measures (RACM).

Partly to address the RACM requirement, ICAPCD adopted local Regulation VIII rules to control PM_{10} from sources of fugitive dust on October 10, 1994, and revised them on November 25, 1996. USEPA did not act on these versions of the rules with respect to the federally enforceable SIP.

On August 11, 2004, USEPA reclassified Imperial County as a serious nonattainment area for PM_{10}. As a result, CAA section 189(b)(1)(B) required all BACM to be implemented in the area within four years of the effective date of the reclassification, i.e., by September 10, 2008.

On November 8, 2005, partly to address the BACM requirement, ICAPCD revised the Regulation VIII rules to strengthen fugitive dust requirements. On July 8, 2010, USEPA finalized a limited approval of the 2005 version of Regulation VIII, finding that the seven Regulation VIII rules largely fulfilled the relevant CAA requirements. Simultaneously, USEPA also finalized a limited disapproval of several of the rules, identifying specific deficiencies that needed to be addressed to fully demonstrate compliance with CAA requirements regarding BACM and enforceability.

In September 2010, ICAPCD and the California Department of Parks and Recreation (DPR) filed petitions with the Ninth Circuit Federal Court of Appeals for review of USEPA's limited disapproval of the rules. After hearing oral argument on February 15, 2012, the Ninth Circuit directed the parties to consider mediation before rendering a decision on the litigation. On July 27, 2012, ICAPCD, DPR and USEPA reached agreement on a resolution to the dispute which included a set of specific revisions to Regulation VIII. These revisions are reflected in the version of Regulation VIII adopted by ICAPCD on October 16, 2012 and approved by USEPA April 22, 2013. Since 2006 ICAPCD had implemented regulatory measures to control emissions from fugitive dust sources and open burning in Imperial County.

FIGURE 4-1
REGULATION VIII GRAPHIC TIMELINE DEVELOPMENT

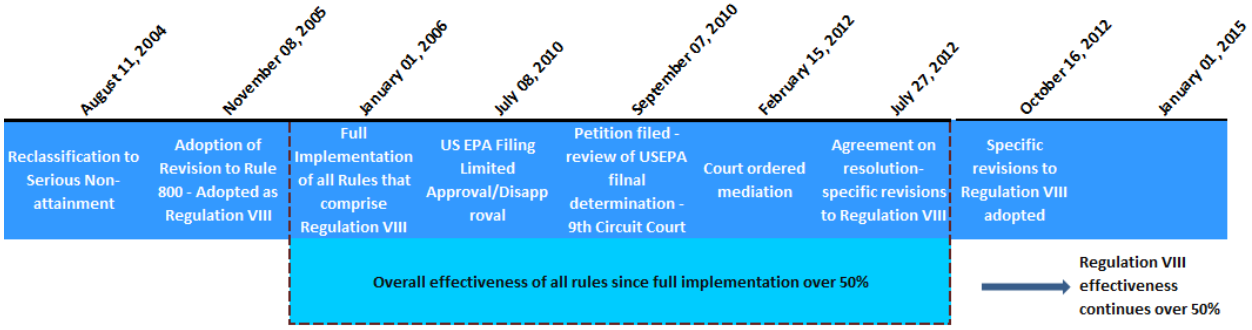


Fig. 4-1: Regulation VIII Graphic Timeline

IV.1.a Control Measures

A brief summary of Regulation VIII which is comprised of seven fugitive dust rules is found below. The complete set of rules can be found in **Appendix D**.

ICAPCD's Regulation VIII consists of seven interrelated rules designed to limit emissions of PM_{10} from anthropogenic fugitive dust sources in Imperial County.

Rule 800, General Requirements for Control of Fine Particulate Matter, provides definitions, a compliance schedule, exemptions and other requirements generally applicable to all seven rules. It requires the United States Bureau of Land Management (BLM), United States Border Patrol (BP) and DPR to submit dust control plans (DCP) to mitigate fugitive dust from areas and/or activities under their control. Appendices A and B of Rule 800 describe methods for determining compliance with opacity and surface stabilization requirements in Rules 801 through 806.

Rule 801, Construction and Earthmoving Activities, establishes a 20% opacity limit and control requirements for construction and earthmoving activities. Affected sources must submit a DCP and comply with other portions of Regulation VIII regarding bulk materials, carry-out and track-out, and paved and unpaved roads. The rule exempts single family homes and waives the 20% opacity limit in winds over 25 mph under certain conditions.

Rule 802, Bulk Materials, establishes a 20% opacity limit and other requirements to control dust from bulk material handling, storage, transport and hauling.

Rule 803, Carry-Out and Track-Out, establishes requirements to prevent and clean-up mud and dirt transported onto paved roads from unpaved roads and areas.

Rule 804, Open Areas, establishes a 20% opacity limit and requires land owners to prevent vehicular trespass and stabilize disturbed soil on open areas larger than 0.5 acres in urban areas, and larger than three acres in rural areas. Agricultural operations are exempted.

Rule 805, Paved and Unpaved Roads, establishes a 20% opacity limit and control requirements for unpaved haul and access roads, canal roads and traffic areas that meet certain size or traffic thresholds. It also prohibits construction of new unpaved roads in certain circumstances. Single-family residences and agricultural operations are exempted.

Rule 806, Conservation Management Practices, requires agricultural operation sites greater than 40 acres to implement at least one conservation management practice (CMP) for each of several activities that often generate dust at agricultural operations. In addition, agricultural operation sites must prepare a CMP plan describing how they comply with Rule 806, and must make the CMP plan available to the ICAPCD upon request.

IV.1.b Additional Measures

Imperial County Natural Events Action Plan (NEAP)

On August 2005, the ICAPCD adopted a NEAP for the Imperial County, as was required under the former USEPA Natural Events Policy, to address PM_{10} events by:

- Protecting public health;
- Educating the public about high wind events;
- Mitigating health impacts on the community during future events; and
- Identifying and implementing BACM measures for anthropogenic sources of windblown dust.

Smoke Management Plan (SMP) Summary

There are 35 Air Pollution Control Districts or Air Quality Management Districts in California which are required to implement a district-wide smoke management program. The regulatory basis for California's Smoke Management Program, codified under Title 17 of the California Code of Regulations is the "Smoke Management Guidelines for Agricultural and Prescribed Burning" (Guidelines). California's 1987 Guidelines were revised to improve interagency coordination, avoid smoke episodes, and provide continued public safety while providing adequate opportunity for necessary open burning. The revisions to the 1987 Guidelines were approved March 14, 2001. All air districts, with the exception of the San Joaquin Valley Air Pollution Control District (SJVAPCD) were required to update their existing rules and Smoke Management Plans to conform to the most recent update to the Guidelines.

Section 80150 of Title 17 specifies the special requirements for open burning in agricultural operations, the growing of crops and the raising of fowl or animals. This section specifically

requires the ICAPCD to have rules and regulations that require permits that contain requirements that minimize smoke impacts from agricultural burning.

On a daily basis, the ICAPCD reviews surface meteorological reports from various airport agencies, the NWS, State fire agencies and CARB to help determine whether the day is a burn day. Using a four quadrant map of Imperial County allowed burns are allocated in such a manner as to assure minimal to no smoke impacts safeguarding the public health. Finally, all permit holders are required to notice and advise members of the public of a potential burn. This noticing requirement is known as the Good Neighbor Policy. The ICAPCD declared January 30 and 31, 2014, a No Burn day **(Appendix A).** No complaints were filed related to agricultural burning on January 31, 2014.

IV.1.c Review of Source-Permitted Inspections and Public Complaints

A query of the ICAPCD permit database was compiled and reviewed for active permitted sources throughout Imperial County and specifically around Brawley during the time of the January 31, 2014 PM_{10} exceedance. Sources located in urban and non-urban areas include aggregate facilities, a Gypsum facility and area sources not subject to the permitting requirements, (i.e. renewable facilities). An evaluation of all inspection reports, air quality complaints, compliance reports, and other documentation indicate no evidence of unusual anthropogenic-based PM_{10} emissions. January 31, 2014 was officially designated as a No Burn day. One complaint was filed on January 31, 2014 related to residential waste burning at the Niland area. The complaint asserted that a neighbor was burning during a declared no burn day at a spot on a three-acre lot and he was concern that the fire may spread to close-by power lines due to high westerly winds. The follow up investigation by certified personnel concluded that illegal burning took place. Although a notice of violation was issued, the actual burn had no impact on the Brawley monitor. The lot is upwind of the Brawley area and the wind direction was westerly therefore it had no impact onto the monitored January 31, 2014 exceedance.

IV.2 Forecasts and Warnings

The NWS Phoenix office issued zone forecasts (see **Appendix A**) on January 30 and January 31 for Imperial County that predicted for west winds of 15 to 25 mph and gusts up to 30 mph. The ICAPCD issued a web-based air quality index[8] advisory for Brawley on January 31. The notice advised that air quality was in the orange range or Unhealthy for Sensitive Groups: “Although general public is not likely to be affected at this AQI range, people with lung disease, older adults and children are at a greater risk from exposure to ozone, whereas persons with heart

[8] The AQI is an index for reporting daily air quality. It tells you how clean or polluted your air is, and what associated health effects might be a concern for you. The AQI focuses on health effects you may experience within a few hours or days after breathing polluted air. EPA calculates the AQI for five major air pollutants regulated by the Clean Air Act: ground-level ozone, particle pollution (also known as particulate matter), carbon monoxide, sulfur dioxide, and nitrogen dioxide. For each of these pollutants, EPA has established national air quality standards to protect public health .Ground-level ozone and airborne particles are the two pollutants that pose the greatest threat to human health in this country. Source: https://airnow.gov/index.cfm?action=aqibasics.aqi.

and lung disease, older adults and children are at greater risk from the presence of particles in the air."

IV.3 Wind Observations

Wind data during the event were available from airports in eastern Riverside County, southeastern San Diego County, southwestern Yuma County (Arizona), and Imperial County. The strongest locally recorded wind speeds were observed at the El Centro Naval Airport and the Imperial Airport. These two airports are located only about five miles away from each other with the El Centro Naval Air Facility further to the west. The El Centro Naval Air Facility measured wind speeds of up to 29 mph during the evening of January 30 and 24 mph on January 31, with gust up to 41 mph on January 30 and 29 mph on January 31, 2014. Wind speeds of over 25 mph are normally sufficient to overcome most PM_{10} control measures. During the January 31, 2014 event wind speeds continued above the 25 mph threshold overcoming the BACM in place.

IV.4 Summary

The weather and air quality forecasts and warnings outlined in this section demonstrate that strong winds behind large low pressure system caused uncontrollable PM_{10} emissions. The BACM list as part of the control measures in Imperial County for fugitive dust emissions were in place at the time of the event. These control measures are required for areas designated as "serious" non-attainment for PM_{10}, such as Imperial County. Thus, the BACM in place at the time of the event were beyond reasonable. In addition, surface wind measurements in the Brawley and surrounding areas to the north and south of Brawley during the event were high enough (at or above 25 mph, with wind gusts over 40 mph) that BACM PM_{10} control measures would have been overwhelmed.

Finally, a high wind dust event can be considered as a natural event, even when portions of the wind-driven emissions are anthropogenic, as long as those emissions have a clear causal relationship to the event and were determined to be not reasonably controllable or preventable. This demonstration has shown that the event that occurred on January 31, 2014 was not reasonably controllable or preventable despite the strong and in force BACM within the affected areas in Imperial County. This demonstration has similarly established a clear causal relationship between the exceedance and the high wind event timeline and geographic location. The January 31, 2014 event can be considered an exceptional event under the requirements of the exceptional event rule.

V Clear Causal Relationship

V.1 Discussion

Meteorological observations identified a low pressure system and accompanying trough and cold front, as responsible for lofting and transporting dust that resulted in an exceedance recorded by the Brawley FEM monitor on January 31, 2014. Strong, gusty westerly winds associated with the weather system swept across the mountains and deserts of southeastern California. These winds were directly responsible for the high PM_{10} concentrations observed in Imperial County on January 31, 2014. Entrained windblown dust from natural areas, particularly from the desert area and anthropogenic sources controlled with BACM, is verified by the meteorological and air quality observations on January 31, 2014. **Figure 5-1** illustrates how strong, gusty winds on January 30 led to the high PM_{10} levels recorded by the Brawley monitor on January 31.

FIGURE 5-1
EVENT DAY ENTRAINMENT

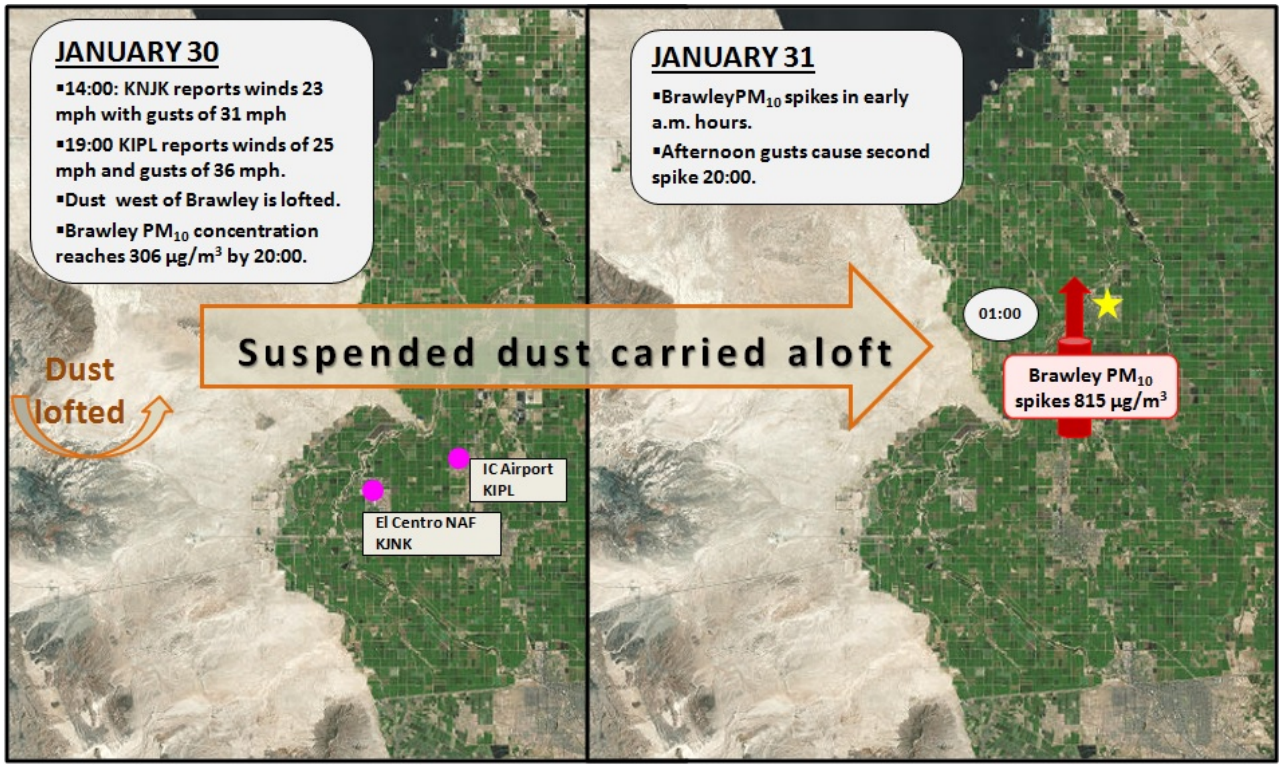


Fig. 5-1: Dust lofted by gusty winds beginning on January 30 impacted the Brawley monitor in the morning hours of January 31. Dust was entrained in the arid, mostly barren portion of the Sonoran Desert on the western edge of Imperial County. Location of source area and extent of entrained dust is approximate.

Figure 5-2 is a HYSPLIT model that shows air moving over the general source area toward the Brawley monitor. The source area for the particulate matter was the western edge of the Sonoran Desert near the Imperial County line and eastward into San Diego County. Large amounts of coarse particles (dust) and PM_{10} were carried aloft by strong westerly winds into the lower atmosphere. The particulate matter was transported downstream and deposited on the Brawley area, affecting air quality.

FIGURE 5-2
ENTRAINMENT SOURCE REGION

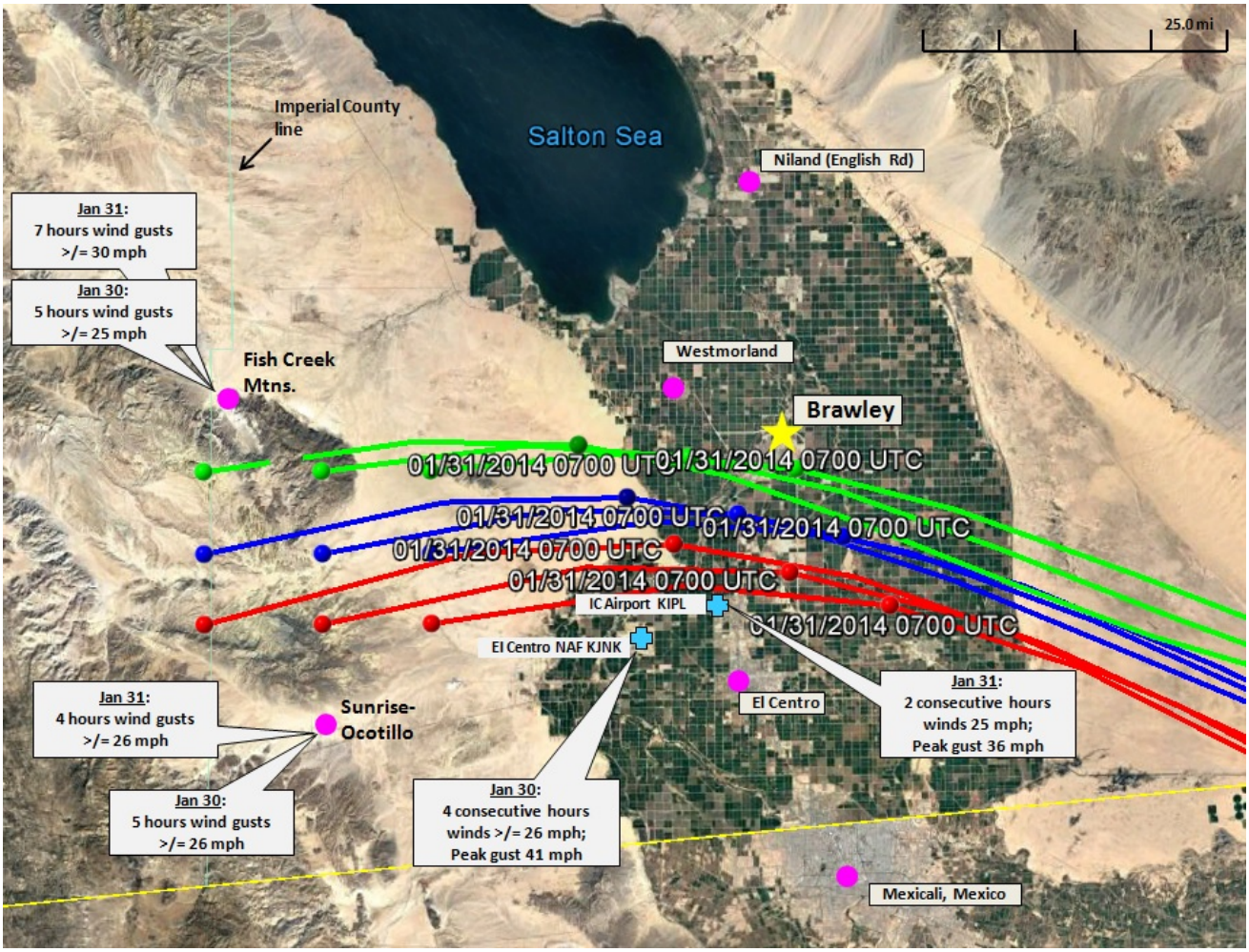


Fig. 5-2: High upstream winds on January 30 played a critical role in the exceedance recorded by the Brawley monitor on January 31. The 8-hour HYSPLIT forward trajectory (beginning 05:00 UTC January 31/21:00 LST January 30) starts at the general source area of entrainment. Lofted dust was transported downstream to Brawley. Dust-laden air was passing over the Brawley monitor at around 07:00 UTC January 31, or 23:00 LST January 30. This was around the period when the Brawley monitor began to experience a spike in PM_{10} concentrations. Air flow is modeled at 50 meters above ground level. Dynamically generated through NOAA's Air Resources Laboratory.

FIGURE 5-3
HYSPLIT FORWARD TRAJECTORY

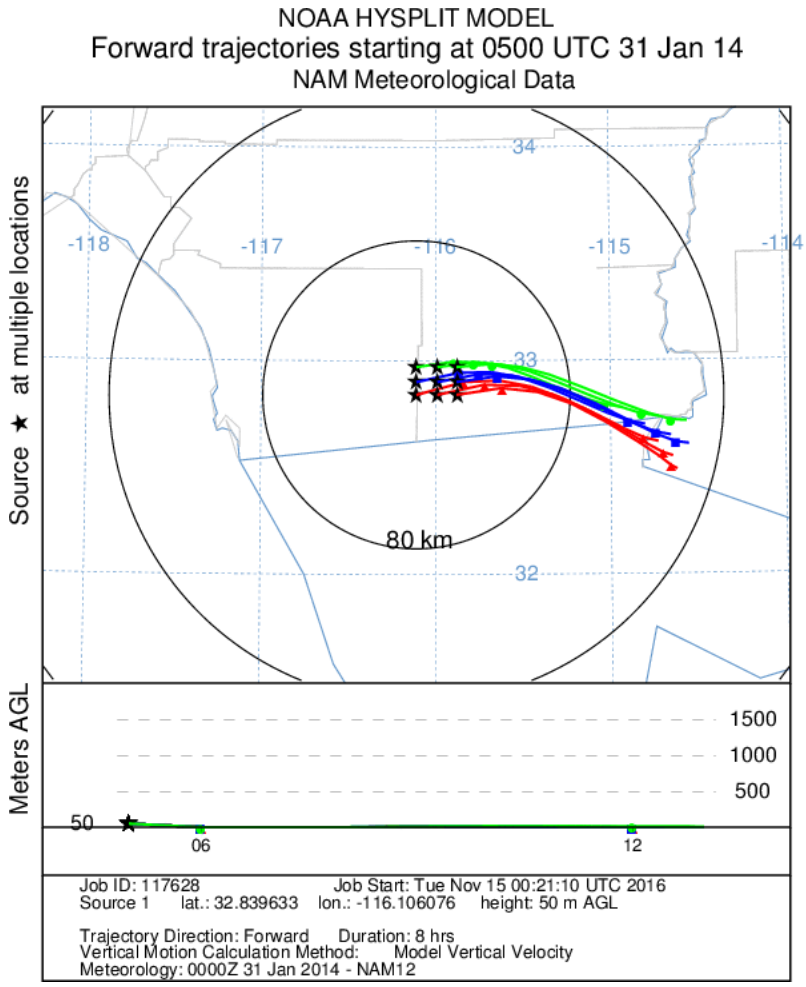


Fig. 5-3: The 8-hour HYSPLIT[9] forward trajectory (beginning 05:00 UTC[10] January 31/21:00 LST January 30) starts at the general source area of entrainment. Air flow is modeled at 50 meters above ground level. Dynamically generated through NOAA's Air Resources Laboratory.

The analysis of the meteorological setting, including weather reports, NWS satellite imagery, indicates that a large low pressure system lead to the development of a prolonged period of

[9] The Hybrid Single Particle Lagrangian Integrated Trajectory Model (HYSPLIT) is a computer model that is a complete system for computing simple air parcel trajectories to complex dispersion and deposition simulations. It is currently used to compute air parcel trajectories and dispersion or deposition of atmospheric pollutants. One popular use of HYSPLIT is to establish whether high levels of air pollution at one location are caused by transport of air contaminants from another location. HYSPLIT's back trajectories, combined with satellite images (for example, from NASA's MODIS satellites), can provide insight into whether high air pollution levels are caused by local air pollution sources or whether an air pollution problem was blown in on the wind The initial development was a result of a joint effort between NOAA and Australia's Bureau of Meteorology. Source: NOAA/Air Resources Laboratory, 2011.

[10] The official abbreviation for Coordinated Universal Time is UTC. It came about as a compromise between English and French speakers. Coordinated Universal Time in English would normally be abbreviated CUT. Temps Universel Coordonné in French would normally be abbreviated TUC. Source: National Institutes of Standards and Technology, 2010.

widespread gusty predominantly west-southwesterly winds across Southern California and into Imperial County. **Appendix B** contains individual meteorological station graphs. On January 30 and January 31, the NWS issued zone forecasts for the Imperial County area, predicting westerly winds of 15 to 25 mph, with gusts up to 30 mph (**Appendix A**). **Figure 5-4** is an illustration of regional wind speeds[11] throughout southeastern California and southwestern Arizona beginning with January 30, 2014 and ending February 1, 2014. The consistency for all stations is evident. For January 30, 2014, all stations recorded elevated wind speeds as early as 10:00. As the system moved across the region elevated wind speeds are evident throughout January 31. Winds started to diminish during late evening hours on January 31, 2014.

FIGURE 5-4
72 HOUR PM_{10} WIND SPEEDS OF REGIONAL SITES

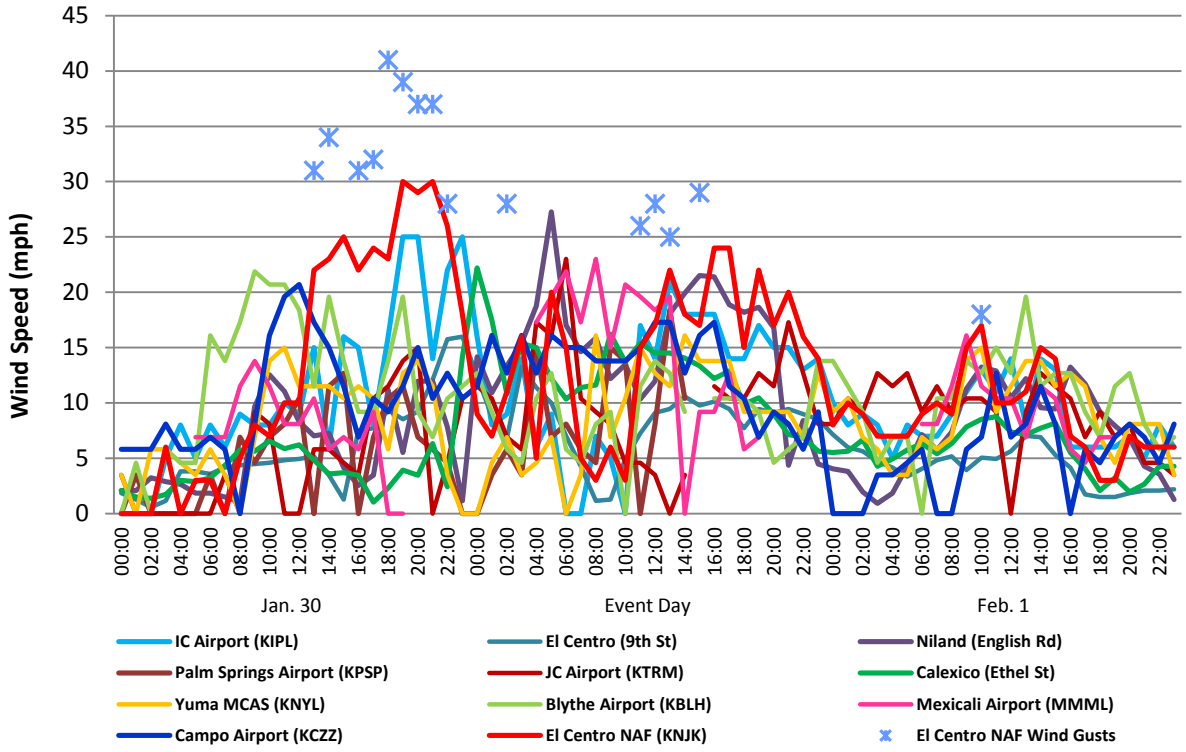


Fig 5-4: Meteorological data collected from regional sites within Imperial, Riverside, and Yuma counties over a three-day period from January 31, 2014 to February 01, 2014, shows a uniform spike in wind speed during the January 31, 2014 exceptional event. Wind data from EPA's AQS data bank, NCEI QCLCD data bank, and the Weather Underground.

Figure 5-5 demonstrates the relationship between the high westerly winds and the transported entrained dust impacting the Brawley monitor. The correlation of hourly BAM 1020 data from

[11] National Weather Service; NOAA's Glossary – Wind Speed: The rate at which air is moving horizontally past a given point. It may be a 2-minute average speed (reported as wind speed) or an instantaneous speed (reported as a peak wind speed, wind gust, or squall)[http://w1.weather.gov/glossary/index.php?letter=w]

the Brawley air monitoring station and the elevated wind speeds during late evening on January 30, 2014, shows that an increase in wind speed was soon followed by an increase in concentrations of PM_{10}. The peak hourly PM_{10} concentration occurred throughout the late evening on January 30 and early morning January 31, 2014, which are associated with the high peak winds and gusts measured at the different stations in Imperial County. **Appendix C** contains additional graphs illustrating the relationship between the high PM_{10} concentrations and wind speeds from other monitoring sites within Imperial and Riverside counties on January 30 and January 31, 2014**.**

FIGURE 5-5
BRAWLEY 48 HOUR PM_{10} CONCENTRATIONS & WIND SPEED CORRELATION

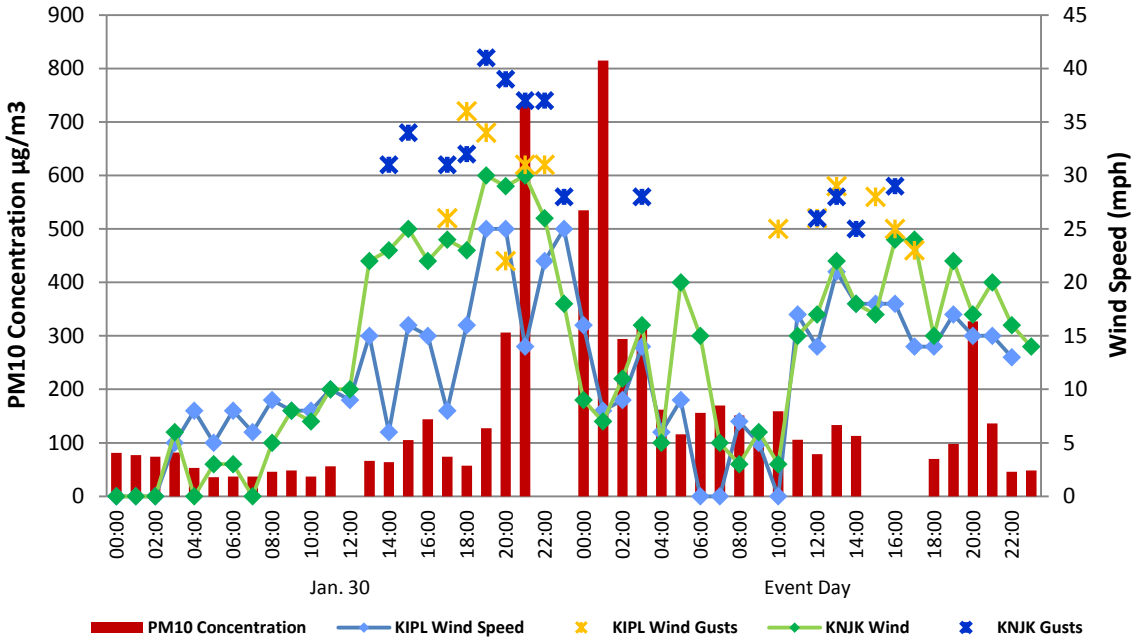


Fig 5-5: Brawley PM_{10} concentrations show a correlation in increase as high winds impacted the area the evening of January 30 to January 31, 2014. Elevated wind speeds continued for over an hour, while gusts approached 35 mph at times. Imperial Airport (KIPL) and El Centro NAF (KNJK) wind data utilized. Air quality data from EPA's AQS data bank. Wind data from the NCEI QCLCD data bank.

Figure 5-6 is a three day depiction, the day before, the day after and the event day on January 31, 2014, of the PM_{10} concentrations for the Brawley monitor and other upwind sites. For the morning and afternoon hours on January 30, the Brawley station showed lower levels of PM_{10} concentrations as winds were light. As westerly winds increased during the evening on January 30, PM_{10} concentrations showed a similar increase across the board. PM_{10} concentrations stayed elevated throughout the early morning on January 31. As winds returned to relatively light conditions on January 31, 2014, so did concentrations.

FIGURE 5-6
72-HOUR REGIONAL PM_{10} CONCENTRATIONS & WIND SPEED

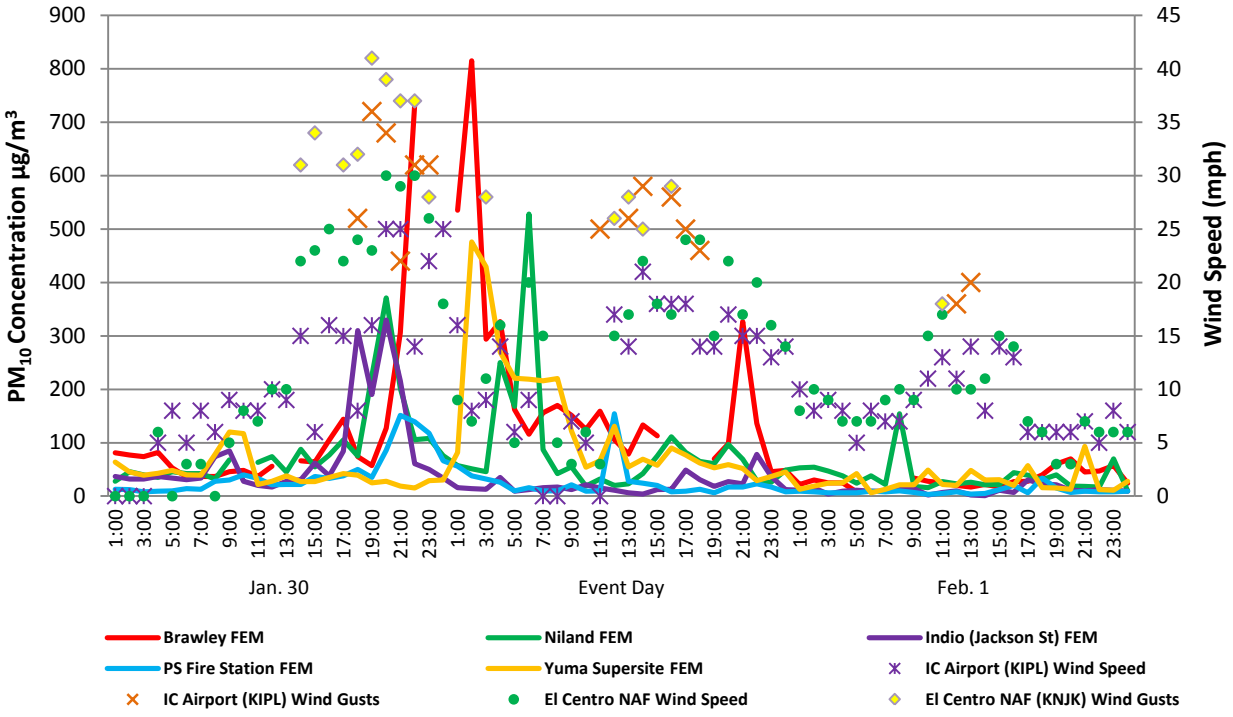


Fig 5-6: This graph illustrates the concentration levels, wind speeds, and gusts for the day before, the day after and January 31, 2014 for the Brawley and Niland monitors. All stations/monitors show a comparable pattern between the elevated wind speeds and concentrations. Air quality data from the EPA's AQS data bank. Wind data from the EPA's AQS data bank and the NCEI's QCLCD data bank.

Figure 5-7 compares hourly PM10 levels with observed visibility at Imperial County Airport (KIPL) and El Centro NAF (KNJK). KIPL reported haze during the 18:00 during the period when KNJK reported a minimum visibility of four miles. A decrease in observed visibility is closely followed by elevated levels of PM_{10} at the Brawley station. The short lag time is attributable to both airfields being slightly upstream of Brawley.

FIGURE 5-7
72 HOUR PM_{10} CONCENTRATIONS & VISIBILITY

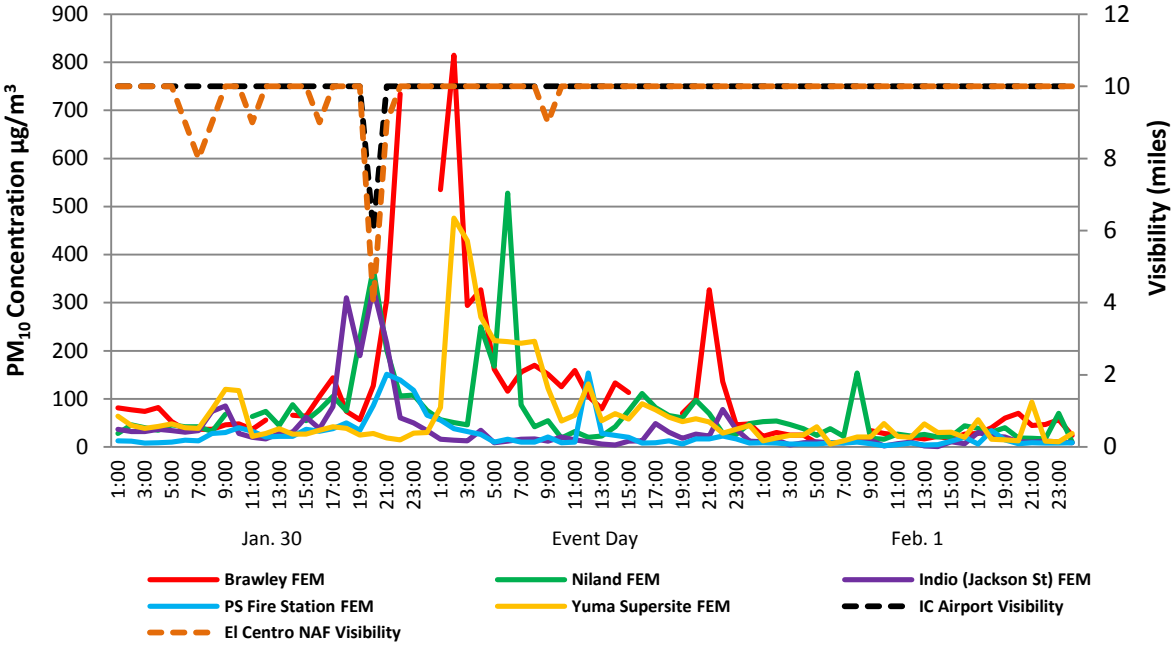


Fig 5-7: Illustrates the observed visibility level as reported from KIPL and KNJK over a three-day period. Air quality data from the EPA's AQS data bank. Visibility data from the NCEI's QCLCD data bank.

Figure 5-8 is the resultant Air Quality Index (AQI) at Brawley for January 31, 2014.[12] The AQI remained in the "Moderate" or Yellow category from 1 a.m. to 2 a.m. At 3 a.m. the AQI rose to the "Unhealthy for Sensitive Groups or "Orange" category and remained there until 12 a.m., confirming that fugitive dust transported by high winds had impacted the quality of air in Imperial County.

[12] The AQI is an index for reporting daily air quality. It tells you how clean or polluted your air is, and what associated health effects might be a concern for you. The AQI focuses on health effects you may experience within a few hours or days after breathing polluted air. EPA calculates the AQI for five major air pollutants regulated by the Clean Air Act: ground-level ozone, particle pollution (also known as particulate matter), carbon monoxide, sulfur dioxide, and nitrogen dioxide. For each of these pollutants, EPA has established national air quality standards to protect public health. Ground-level ozone and airborne particles are the two pollutants that pose the greatest threat to human health in this country. Source: https://airnow.gov/index.cfm?action=aqibasics.aqi

FIGURE 5-8
MPERIAL VALLEY AIR QUALITY INDEX - BRAWLEY JANUARY 31, 2014

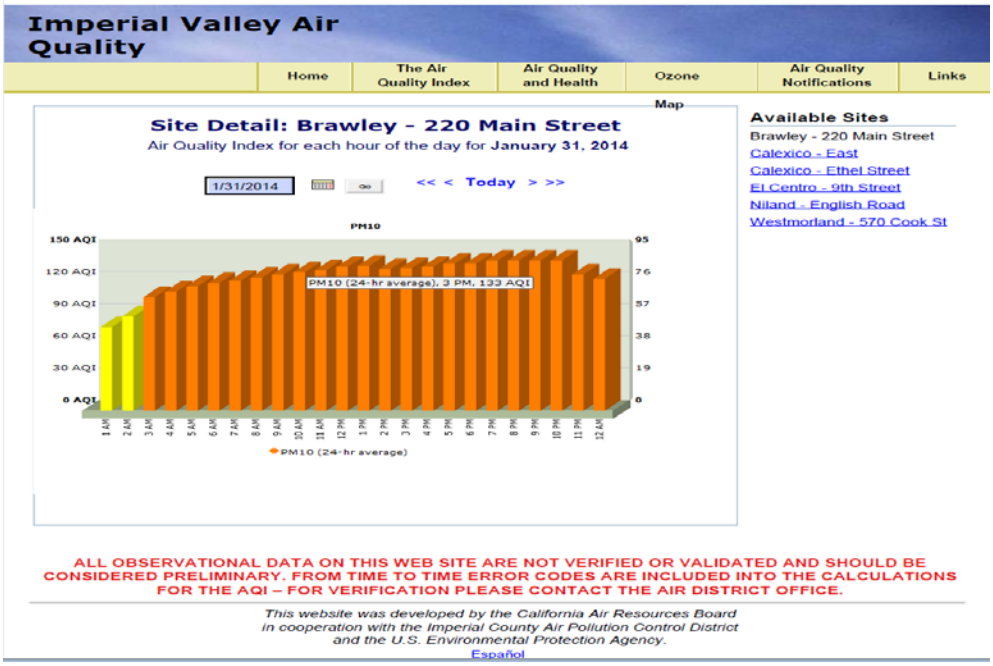


Fig 5-8: Demonstrates that air quality in Imperial County was affected when a large low pressure system occurred on January 31, 2014. High winds associated with the weather system transported dust that affected air quality in the Brawley area.

V.2 Summary

The preceding discussion, graphs, figures, and tables provide wind speed and PM_{10} concentration data illustrating the effect on air quality from the low pressure system that passed over southeastern California on January 30 and January 31. The information provides a clear causal relationship between the entrained windblown dust and the PM_{10} exceedance measured at the Brawley monitor on January 31, 2014. Furthermore, the issued air quality index illustrates the effect upon air quality within the Brawley area. Large amounts of coarse particles (dust) and PM_{10} were carried aloft by strong westerly winds into the lower atmosphere. The likely area of origin is the desert areas located and part of the Sonoran Desert in Imperial County. Combined, the information demonstrates that the elevated PM_{10} concentration measured on January 31, 2014, coincided with high wind speeds, and that strong winds were experienced over the southern portion of Riverside County and all of Imperial County.

VI But-For Analysis

VI.1 Discussion

Prior to October 3, 2016 in order to qualify as an exceptional event, section 50.14(c)(3)(iv)(D) of 40 CFR Part 50 required a demonstration the "[t]here would have been no exceedance or violation but for the event." This requirement has been removed from the most recent approved revision to the EER, codified at 40 CFR 50.1, 20.14 and 51.930. While it is typical for rules to have an effective date 30 days after publication USEPA has promulgated these changes as effective upon publication, October 3, 2016. Because public review of this demonstration included this section the ICAPCD is retaining this section intact.

To qualify as an exceptional event, section 50.14(c)(3)(iv)(D) in 40 CFR Part 50 requires a demonstration that "[t]here would have been no exceedance or exceedance but for the event." To meet the "but for" requirement the demonstration must show that no unusual anthropogenic activities occurred in the affected area that could have resulted in the exceedance, other than the high wind event. Activities that create anthropogenic PM_{10} were not out of the ordinary and were typical throughout Imperial County immediately preceding, during and after the event. BACM was in place and at the levels consistent for the time of the year with all BACM being implemented for both fugitive dust emissions and agricultural burning.

Prior speciation data provided by the CARB for $PM_{2.5}$ samples in Calexico indicates that while the southern portion of Imperial County is impacted by compositions associated with waste burning, PM mass concentrations further north in El Centro and beyond are primarily fugitive dust.

Strong evidence included within this demonstration includes the time-series plots of PM_{10} and wind speeds which establish a clear causal relationship between the arrival of dust-laden winds and elevated PM_{10} concentrations impacting the Brawley monitor. In addition, multiple independent measurements of wind speed, wind direction, and concentrations all point to the presence of strong gusty winds as the manner by which PM_{10} was transported into Imperial County. High PM_{10} concentrations and gusty winds were also reported in other parts of California, illustrating the widespread, regional nature of this event. In addition, PM_{10} concentrations were well below the NAAQS on days immediately before and after the windblown dust event. The source regions for the PM_{10} are clearly identified as open desert areas within the Sonoran Desert west of Imperial County. Finally, all reasonable control measures were in place and/or implemented on a continual basis and activities were typical for the season. An evaluation of all inspection reports, air quality complaints, compliance reports, and other documentation indicate no evidence of unusual anthropogenic-based PM_{10} emissions. January 31, 2014 was officially designated as a No Burn day. However, one complaint was filed on January 31, 2014 related to residential waste burning at the Niland area. The complainant asserted that a neighbor was burning during a declared no burn day at a spot on a three-acre lot and he was concern that the fire may spread to close-by power lines due to

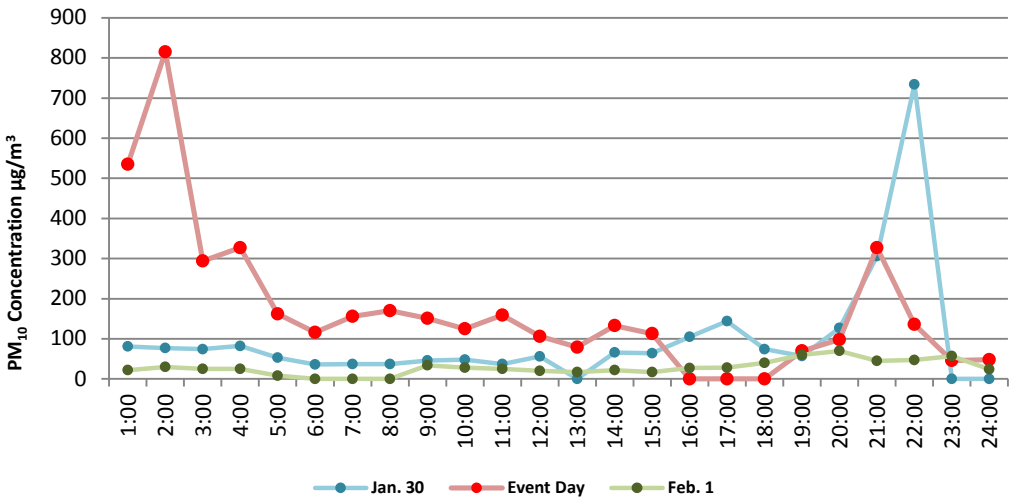
high westerly winds. The follow up investigation by certified personnel concluded that illegal burning took place. Although a notice of exceedance was issued, the actual burn had no impact on the Brawley monitor. The lot is upwind of the Brawley area and the wind direction was westerly therefore it had no impact to the January 31, 2014 exceedance.

The demonstration taken as a whole demonstrates there was a clear causal relationship between PM_{10} transported by strong west-southwesterly winds originating in desert areas outside the Imperial County PM_{10} Nonattainment Area, originating within the southern regions of the Sonoran Desert located west of Imperial County. Based on the data provided in the prior sections of this demonstration the ICAPCD finds that the weight of evidence supports the conclusion that but for the existence of dust emissions generated by strong winds associated with a large low pressure system and the associated transport of PM_{10}, there would have been no exceedance of the 24 hour PM_{10} NAAQS on January 31, 2014.

VI.2 Summary

Figure 6-1 illustrates the three day 24-hr concentration levels for the Brawley monitor as they occurred on the day before the event, January 30, 2014, the day of the event, January 31, 2014 and the day after the event, February 01, 2014. The day before and the day after the January 31, 2014 event, represents measured concentrations in the normal range[13]. However, when one looks at the January 31, 2014 concentrations of particulate matter the sharp increase in concentration indicates the occurrence of an event.

FIGURE 6-1
BRAWLEY 3-DAY 24-HR PM_{10} CONCENTRATIONS
JANUARY 30, 2014 THROUGH FEBRUARY 1, 2014



[13] Although there were no exceedances of the NAQQS on January 30, 2014 the information by the National Weather Service indicates that the low pressure system moved into Imperial County during the evening hours on January 30, 2014.

Fig 6-1: The Brawley three-day time series for the hourly concentrations for the day before, during and after the event provide evidence that an event took place which caused concentrations of particulate matter to elevate.

Table 6-1 below is the comparison of the hourly measurement as 24 hour concentrations and hourly maximums to the day before and after the event day of January 31, 2014. The table illustrates the quantitative amount contributed by the fugitive dust brought by the wind event impacting the Brawley monitor. The measured concentration the day before January 31, 2014 is approximately 44% lower and the measured concentration the day after January 31, 2014 is 84% lower for Brawley.

TABLE 6-1
IMPERIAL COUNTY COMPARISON TO "NORMALS"

	PM10 Concentration	Event Day (Jan 31)	Jan 30	Feb 01	Seasonal Avg.	Seasonal Avg. Percentile	Seasonal (Jan to Mar) 95th Percentile	Seasonal (Jan to Mar) 99th Percentile
Brawley	24-hr Avg.	198.7	111.9	32.5				
Brawley	Hourly Maximum	815.3	734.8	70.0	37.3	68	77.9	190.9

VII Conclusions

The PM_{10} exceedance that occurred on January 31, 2014, satisfies the criteria of the EER, which states that in order to justify the exclusion of air quality monitoring data evidence must be provided for the following elements:

TABLE 7-1 Technical Elements Exceptional Event Demonstration for High Wind Dust Event (PM_{10})		Document Section
1	whether the event was **not reasonably controllable or preventable** (nRCP)	23-27
2	whether there was **a clear causal** relationship (CCR) "There is a clear causal relationship between the measurement under consideration and the event…	28-35
3	whether there would have been no exceedance or exceedance **but for** the event (NEBF) "There would have been no exceedance or exceedance but for the event". ***(Removed requirement with revision to the EE Rule October 3, 2016)***	36-38
4	whether the event **affects air quality** (AAQ) ...the event that is claimed to have affected the air quality in the area";	19-22; 28-35; 39
5	whether the event was caused by human activity unlikely to recur or was a natural event (HAURL / **Natural Event**) "The event satisfies the criteria set forth in 40 CFR §50.1(j)" for the definition of an exceptional event (see above);	5-18; 40
6	whether the event was in excess of **normal historical fluctuations** (HF) "The event is associated with a measured concentration in excess of normal historical fluctuations, including background"; and	19-22

*40 CFR §50.1

VII.1 Affects Air Quality

The preamble to the EER states that an event is considered to have affected air quality if it can be demonstrated that there is a clear causal relationship between the monitored exceedance and the event, and that the event is associated with a measured concentration in excess of normal historical fluctuations. Given the information presented in this demonstration, particularly Section V, we can reasonably conclude that the event in question affected air quality.

VII.2 Not Reasonably Controllable or Preventable

In order for an event to be defined as an exceptional event under section 50.1(j) of 40 CFR Part 50 an event must be "not reasonably controllable or preventable." This requirement is met by demonstrating that, despite BACM in place in Imperial County, high winds overwhelmed all BACM controls. The PM_{10} exceedances measured at the Brawley monitor and discussed within this report was caused by naturally occurring strong gusty winds that transported fugitive dust into Imperial County and other parts of southern California from areas located within the Sonora Desert regions to the west of Imperial County. These facts provide strong evidence that the PM_{10} exceedance on January 31, 2014, was not reasonably controllable or preventable.

VII.3 Natural Event

As discussed within this demonstration, the PM_{10} exceedance which occurred in Brawley on January 31, 2014, was caused by transport of fugitive dust into Imperial County by strong predominantly westerly winds associated with a large low pressure system. The event therefore qualifies as a natural event.

VII.4 Clear Causal Relationship

The time series plots of PM_{10} concentrations at different areas in Imperial and Riverside County monitors demonstrates a consistency of elevated gusty winds and concentrations of PM_{10} at the Brawley monitor on January 31, 2014 (Section V). In addition, these time series plots and graphs demonstrate that the high PM_{10} concentrations and the gusty winds were an event that was widespread, regional and uncontrollable. Arid conditions preceding the event resulted in soils that were particularly susceptible to particulate suspension by the elevated gusty winds. Finally, days immediately before and after the high wind event had PM_{10} concentrations well below the NAAQS.

VII.5 Historical Norm

The historical annual and seasonal 24-hr average PM_{10} values measured at the Brawley monitor were historically unusual compared to a multi-year data set (Section III).

VII.6 But For

On the basis of the weight of evidence described above and in Section VI, the exceedance of the federal 24-hr PM_{10} standard on January 31, 2014, which impacted the Brawley monitor, would not have occurred but for the period of strong gusty winds that transported dust from the open desert areas of west of Imperial County. *(Requirement removed with the revisions to the Exceptional Event Rule effective October 3, 2016)*

Appendix A: Public Notification that a potential event was occurring (40 CFR §50.14(c)(1)(i))

This section contains zone forecasts issued for Imperial County by the National Weather Service for January 30 and January 31, 2014. A high wind warning for the Coachella Valley in eastern Riverside County supports that the wind event was regional.

Appendix B: Meteorological Data.

This appendix contains the time series plots, graphs, wind rose, etc. for selected monitors in Imperial and Riverside counties. These plots, graphs and tables demonstrate the regional impact of the wind event.

Appendix C: Correlated PM_{10} Concentrations and Winds.

This appendix contains the graphs depicting the correlations between PM_{10} Concentrations and elevated wind speeds for selected monitors in Imperial and Riverside counties. These graphs demonstrate the regional impact of the wind event.

Appendix D: Regulation VIII – Fugitive Dust Rule.

This appendix contains the compilation of the BACM adopted by the Imperial County Air Pollution Control District and approved by the United States Environmental Protection Agency. A total of seven rules numbered 800 through 806 comprise the set of Regulation VIII Fugitive Dust Rules.